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SEAMANSHIP.

BY

WILLIAM CULLEY BERGEN,

Master in the Mercantile Marine,

Author of Bergen's "Navigation," and several other Works.

PRICE TWO SHILLINGS [redacted]

Presented to Purchasers of the Third Edition of Bergen's "Navigation."

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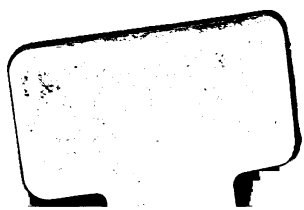

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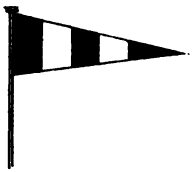
"CODE SIGNAL" AND  "ANSWERING PENNANT"

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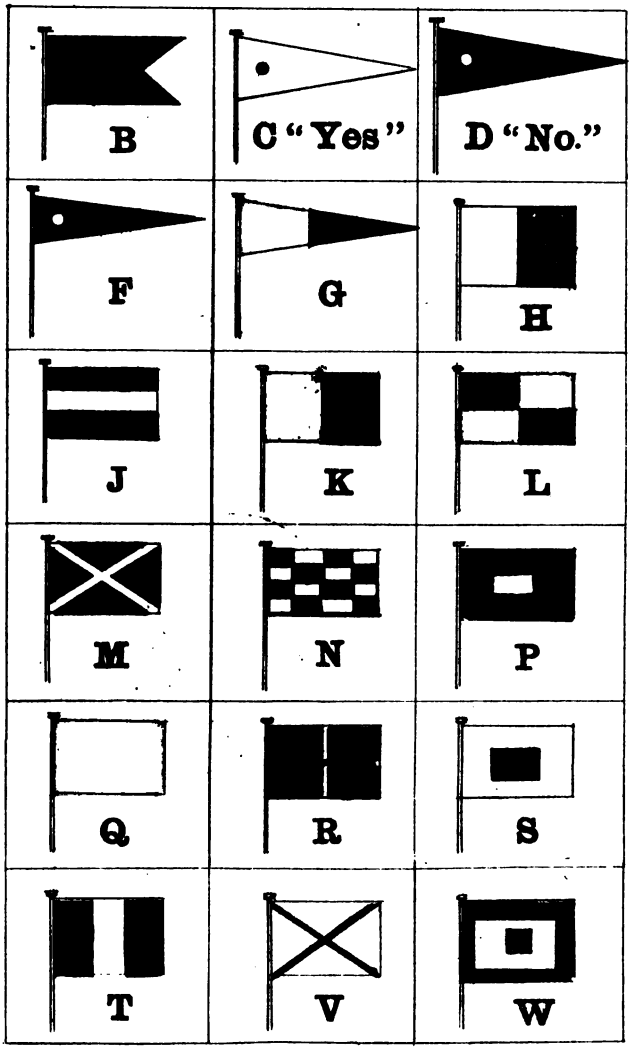

SEAMANSHIP.

BY

WILLIAM CULLEY BERGEN,

Master in the Mercantile Marine,

Author of Bergen's "Navigation," and several other Works.

PRICE TWO SHILLINGS AND SIXPENCE.

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PREFACE.

THE following work is derived principally from the author's treatise on Navigation. It is here put in the form of question and answer. There are some additional subjects treated, which it is hoped will increase the utility of the work.

It is difficult, without repetition, to keep the seamanship for the several grades distinct. The author has therefore thought it best to treat every subject completely, and the following Rules will enable the candidate to select the part he wants. Or his teacher will point it out to him :—

QUALIFICATIONS FOR CERTIFICATES OF COMPETENCY FOR A "FOREIGN-GOING SHIP."

The qualifications in Seamanship required for the several ranks undermentioned are as follow :—

A SECOND MATE must be seventeen years of age, and must have been four years at sea.

IN SEAMANSHIP.—He must give satisfactory answers as to the rigging and unrigging of ships, stowing of holds, &e. ; must understand the measurement of the log-line, glass and lead-line ; be conversant with the rule of the road, as regards both steamers and sailing vessels, and the lights and fog signals carried by them, and will also be examined as to his acquaintance with "the Commercial Code of Signals for the use of all Nations."

An ONLY MATE must be nineteen years of age, and have been five years at sea.

IN SEAMANSHIP.—In addition to what is required for a Second Mate, he must know how to moor and unmoor, and to keep a clear anchor ; to carry out an anchor ; to stow a hold ; and to make the requisite entries in the ship's log. He will also be questioned as to his knowledge of the use and management of the mortar and rocket lines in the case of the stranding of a vessel, as explained in the official log-book.

A FIRST MATE must be nineteen years of age, and have served five years at sea, of which one year must have been as either Second or Only Mate, or as both.

IN SEAMANSHIP.—In addition to the qualification required for an Only Mate, a more extensive knowledge of seamanship will be required, as to shifting large spars and sails, managing a ship in stormy weather, taking in and making sail, shifting yards and masts, &c., and getting heavy weights, anchors, &c., in and out; casting a ship on a lee-shore; and securing the masts in the event of accident to the bowsprit.

A MASTER must be twenty-one years of age, and have been six years at sea, of which at least one year must have been as First or Only Mate, and one year as Second Mate.

He will be examined as to his competency to construct jury rudders and rafts; and as to his resources for the preservation of the ship's crew in the event of wreck. He must possess a sufficient knowledge of what he is required to do by law, as to entry and discharge, and the management of his crew, and as to penalties and entries to be made in the official log; and a knowledge of the measures for preventing and checking the outbreak of scurvy on board ship. He will be questioned as to his knowledge of invoices, charter party, Lloyd's agent, and as to the nature of bottomry, and he must be acquainted with the leading lights of the channel he has been accustomed to navigate, or which he is going to use.

In cases where an applicant for a certificate as Master Ordinary has only served in a fore-and-aft-rigged vessel, and is ignorant of the management of a square-rigged vessel, he may obtain a certificate on which the words "*fore-and-aft-rigged vessel*" will be written. This certificate does not entitle him to command a square-rigged ship. This is not, however, to apply to Mates, who, being younger men, are expected for the future to learn their business completely.

An EXTRA MASTER'S EXAMINATION is voluntary, and intended for such persons as wish to prove their superior qualifications, and are desirous of having certificates for the highest grade granted by the Board of Trade.

IN SEAMANSHIP.—The extra examination will consist of an inquiry into the competency of the applicant to heave a ship down, in case of accident befalling her abroad; to get lower masts in and out; and to perform such other operations of a like nature as the Examiner may consider it proper to examine him upon.

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After the preceding, a few pages are printed from the stereotype plates of the third edition of Bergen's Navigation, comprising Distant, Semaphore, Boat, and Danger Signals, and the Laws of Storms.

After the preceding, some pages are selected from the stereotype plates of the Appendix to the fourth edition of Bergen's Navigation, now in course of preparation.

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SEAMANSHIP.

FOR SECOND MATE.

CUTTING RIGGING.

Question or Command. How do you cut Rigging correctly?

Answer. Draw a plan and cut by the plan.

FITTING RIGGING.

Lower Rigging.

Q. What is done with the Shroud rope before cutting it?

A. Stretch the shroud rope about an inch to the foot, that is about one-twelfth, before cutting it. It is better to let it remain on the stretch for a day or two before cutting it.

Q. What is done with the Standing Rigging?

A. Standing rigging is wormed, parcelled, and served, wherever there will be any chafe on it; but no more service should be put on than will prevent chafe, as it is better for it to be exposed to the air. Canvas coats used formerly to be put over the rigging at the mast heads, and canvas sewed over block strops, and the confined water and air soon caused the ropes to rot. The rigging should be wormed before it is stretched.

Q. Which shrouds are most liable to chafe?

A. The foremost shroud of the fore rigging is liable to chafe from the tacks, sheets, and other gear of the foresail; and that of the main rigging

from the gear of the mainsail, and they are therefore served the whole way, and in addition, chafe battens and mats are put on where there is much chafe.

Q. How many parts are the other shrouds divided into?

A. The other pairs of shrouds are divided into three parts, and the middle part is served, and, in addition, mats and rounding are put on where the fore or main yard would chafe the rigging when the yard is braced up.

Q. How is rope parcelled?

A. In parcelling, tar the rope well, begin at the bottom, and parcel with the lay of the rope upwards to the middle mark of each pair of shrouds.

The edges of the parcelling thus overlap each other in such a manner, that if any water get under the service, it is prevented from getting to the rope.

Serve as taut as possible against the lay of the rope, beginning at the middle mark.

Q. What is the size of the eyes of the rigging?

A. The eye of the starboard first pair of shrouds is made about once and a quarter times the circumference of the mast head. Each of the others is in succession made the breadth of a seizing larger than the one that precedes it.

Q. Which is the strongest way of securing a dead eye?

A. Experiments that have been made, prove that the strongest way of securing a dead-eye, is by a throat seizing and two end seizings; the next in strength is by what is called the "cutter's stay plan;" and the weakest is by splicing it in.

Q. How is a dead eye turned in?

A. Tar and parcel the score of the dead-eye, and turn the rope in with the sun if it be right-handed rope, but against the sun if it be left-handed rope; pass the throat seizing with nine or ten turns, and as the outer turns are most stretched when the quarter seizing is passed, they ought not to be passed quite so tight as the inner turns; pass the quarter seizings half-way to the end, and then the end seizings; tar the end of the shroud, and put the cap on.

If the shroud be right-hand laid rope, the standing part of the shroud will be aft on the starboard side, and forward on the port side; and the reverse if the rope be hawser laid.

Topmast Rigging.

Q. How is the topmast rigging fit?

A. The topmast rigging is fit in a similar manner to the lower rigging, it being parcelled and served where it is liable to be chafed. In some cases, it is set up with dead-eyes and lanyards; but in other instances, it is passed through a bull's eye, and set up on its end.

Topgallant Rigging.

Q. Explain how the topgallant rigging is set up.

A. The topgallant rigging is generally rove through holes in the ends of the crosstrees, and set up with a lanyard to eyebolts in the spider hoop. In some cases it is set up in the top, and in others it is passed through a bull's eye, or a thimble, and set up on its end.

Stays.

Q. How is the fore stay set?

A. In some cases, the fore stay is double; the bight is passed under the bowsprit, and it sets up with two eyes and a lanyard abaft the mast. In other instances, it is single, has a collar, and is lashed at the mast head, and the other end is rove through a bull's eye, and is set up on its end; or a dead-eye is turned in, and it sets up with a lanyard to a heart on the bowsprit.

When stays are double, they ought to be seized together, or they will chafe.

Q. How does the fore topmast stay set up?

A. The fore topmast stay is rove through the bee on the bowsprit, and then through a bull's eye at the bow, and sets up on its end. In some cases it sets up with dead-eyes and a lanyard.

Q. Explain how the jib stay, fore topgallant stay, and fore royal stay set up.

A. The jib stay, fore top gallant stay, and fore royal stay generally reeve through holes or over sheaves in the jib-boom, and they set up with a gun-tackle purchase; or with lanyards rove through thimbles, or bull's eyes, and eyebolts.

In small ships which have a traveller on their jib-boom, the jib stay comes down alongside of the foremast, and sets up with a double and single block.

Q. How is the main stay set up?

A. The main stay is set up to the hook at the bows, or to a strong bolt at the deck, or to a Sampson-post put in for the purpose.

Q. How is the main topmast stay set up?

A. The main topmast stay reeves through a heart or thimble at the foremast head, or through a hole in the cap, and sets up in the top; in some cases it sets up on deck.

Q. Where do the other small stays set up, and what kind of rope is now coming into extensive use?

A. The other small fore-and-aft stays set up aloft.

Wire rope is now coming into extensive use for rigging, and answers well, particularly for fore-and-aft stays.

Rigging Lower Yards.

Q. Rig a lower yard.

A. An iron hoop with eye-bolts and thimbles in it, for the lift to splice over, and reef tackle blocks to shackle to, is generally fit on the yard. A short piece of chain, with a big link in one end, and a thimble in the other, is used for the foot rope, the big link is put over the brace block eye-bolt, and the rope is spliced over the thimble.

The brace pendant is often chain.

The clue garnet block is generaliy at the middle of the yard, but a better plan is to place it at the yard arm; by doing so, and reeving the buntlines through thimbles half-way down the sail, so that the lower half of them is abaft the sail; when the sail is hauled up in a gale of wind, it is secure, and is almost furled.

Seize on the leachline block and beckets on the jackstay. In large ships, a block is used for the topsail sheets; some ships have an iron clamp and sheave for them; and small vessels have an iron sheave in the yard arm.

Rigging Topsail Yards.

Q. Rig a topsail and topgallant yard.

A. Put on the earring strop first—a small eye-bolt is often used instead of this strop; next put on the foot ropes, Flemish foot ropes, lifts, reef-tackle blocks, and brace blocks; the quarter blocks are either lashed, or shackled on.

The topgallant yards and royal yards are fit in a similar manner, with some slight exceptions.

RIGGING SHIP.

Rigging Shears.

Q. Take the mast shears on board of a large ship.

A. Take the shears on deck, over the bows, small ends aft, by means of a small derrick rigged forward; or hang skids over the side and parbuckle them in.

Q. Rig the shears.

A. Place the heels fair, and not far apart. Put the small ends as high as convenient, cross, and lash them, with a figure of eight. Open the heels, and place them on a hard wood plank, with its lower edges chamfered. Place a strong plank under the beams, below the shears, and a shore under the plank.

Make luff tackles fast to both foreside and afterside of each shear heel, to secure and transport the shears, haul the after tackle tight and belay it. Lash the upper purchase block over the shear lashing, so that it will hang fair under the cross, and work free, put canvas over the shear lashing to prevent chafe.

Reeve the first part of the main fall through the middle sheave, make the lower purchase block fast forward.

Lash a small purchase block, for a truss tackle, to the after shear head, so that the fall may work clear of the main fall.

Lash a girtline block above the last block. Clove-hitch two stout ropes to the shear heads, so as to have two fore guys, and two after guys, put luff tackles on each of those guys.

Raise the shears with the main purchase; let the main tackle plumb the mast hole.

If there be much difficulty in raising the shears, rig a small derrick to raise them until the main fall acts with more power.

Taking in the Mizen Mast.

Q. Take in the mizen mast.

A. Place the mast alongside with its head aft, and foreside upwards.

Lash the lower purchase block to the foreside of the mast, between two points measured from the heel of the mast; the lower one is found by measuring the distance from the mast step to the mast combings; the upper one is found by measuring the distance from the bottom of the lower block, when it is block and block to the rail; be careful to allow for the lashing stretching.

Sling skids over the side, to carry the mast clear of eye-bolts, channels, &c. Heave away until the mast is nearly at the height of the rail. Make a tackle fast to ease it in board. Put on the trestletrees, top, and cap; make girtlines fast to the mast head, and the truss tackle fast below the top. Heave away until the mast is high enough, point it down the mast hole, lower away, tar, or white lead the tenon, step the mast, and wedge it temporarily. Shift the shears.

Step the mainmast and foremast in a similar manner.

Note.—If it is a poop deck ship, another pair of shears must be rigged after the mizenmast is in.

Taking in the Bowsprit.

Q. Take in the bowsprit.

A. Make a strong rope fast to the foremast head, and lead it well aft, to act as a stay. Let the shears slope well forward. Make the fore guys fast to the foremast head. Lash the lower purchase block to the upper side of the bowsprit, outside of the distance from the heel to the knight-heads, make the truss tackle and also guys fast to the outer end of the bowsprit, make guys fast to the heel, put on the cap, and sway away.

When the bowsprit is well topped up by the truss tackle, if the shears

cannot be sufficiently sloped to point the heel, rig a small spar, as a jib-boom, over the forecastle, lash its inner end, fix a tackle at the outer end to haul the bowsprit out, and point it in.

Small ships have no topgallant forecastle, and hence their bowsprits are taken in without any difficulty.

Placing a Top over a Mast Head.

Q. Place a top over a mast head.

A. Lay the top on deck abaft the mast, foreside against the mast, lower part down. Reeve girtlines on each side of the mast head. Pass the end of each under the fore part of the top, and make the ends fast to the after crosstrees, place a few stops between the fore part and after part of the top. Make guys fast to both foreside and afterside of the top. Sway away. When the top is high enough, cast off the upper stops. Sway away again. Cast off the other stops. Steady the top by the guys, and let it fall over the mast head.

Placing the Lower Rigging over the Mast Head.

Q. Place the lower rigging over the mast head.

A. Tar the mast head in the way of the rigging, tar and parcel the bolsters, and place them. If the shrouds are an odd number. Bend the girtline on to the starboard fore swifter. If they are an even number. Bend on to the starboard first pair of shrouds, below the seizing, so that the shrouds may go over the mast head, stop the gantline to the eye of the shrouds and sway away. When the eye is up to the girtline block, cast off the stop, sway away and place the shrouds over the mast head. Be careful to have them fair, and forced well down on the bolsters.

Proceed, in like manner, with the first pair of shrouds on the port side, then with the second pair on the starboard side; and so on.

Next, place the lower stay over the mast head.

Securing the Bowsprit.

Q. Secure the bowsprit.

A. In order to bring the bowsprit down, hang a cask of water, or other heavy weight to its end; or send the jib-boom out.

Pass the gammoning and frap it, and set up the bobstay and bowsprit shrouds.

Reeving the Lanyards of the Lower Rigging.

Q. Reeve the lanyards of the lower rigging.

A. Reeve them so that the knots come under the end part of the shroud.

Setting Up the Lower Rigging.

Q. Set up the lower rigging.

A. Stay the mast; then set the rigging up. Begin with the starboard first pair of shrouds, then the port first pair; and so on.

Getting a Heavy Cap on the Lower Mast Head.

Q. Get a heavy cap on to the lower mast head.

A. Send the cap on to the top with a girtline; place the round hole of the cap over the hole in the trestletrees. When the topmast is sent up, lash the cap to it; when the topmast is high enough for the purpose, slue it, and place the cap on the mast head.

Sending up a Topmast.

Q. Send a topmast up.

A. Place the mast alongside, with its head forward, and afterside up. Hook a top block on to the eye-bolt in the lower cap, reeve a mast rope through this block, make its end fast to the middle of the topmast, and heave the topmast on to the deck, cast off the mast rope. Pass the end of the mast rope down through the hole in the trestletrees, through the sheave hole in the heel of the topmast, reeve the rope from the same side as the top block is on, reeve the end through the sheave hole at the topmast head, make the end fast, and rack the two parts of the mast rope together. Sway away, point the mast through the cap; when it is necessary double the mast rope. Sway away, and fid the mast.

Sending Topmast Crosstrees up.

Q. Send the topmast crosstrees up.

A. When the head of the topmast is a few feet above the lower cap. Lash girtline blocks on to the topmast head, and send the crosstrees up. Place them so that their after part may rest on the lower cap, and their fore part against the topmast. Lower the mast until the crosstrees fall into their place, then sway away again.

To Place the Rigging over the Topmast Head.

Q. Place the rigging over the topmast head.

A. Tar the mast in the way of the rigging; tar, parcel, and place the bolsters. Put the shrouds over the mast head, in the same order as the lower rigging; then, the back stays; next, the topmast stay; and last, the lift strop.

To Send up a Long Topgallant Mast.

Q. Send up a long topgallant mast.

A. Reeve the mast rope in a similar manner to that of the topmast.

Place the jack crosstrees over the hole in the topmast cap. Put on a grommet, then the eyes of the stay or stays, then the eyes of the shrouds and backstays.

Next place a grommet for the royal mast, and the royal rigging in the same order.

Then a grommet for the skysail mast, and then the skysail stay, and back stay. Sway away, and point the mast through the jack; put on the truck with the signal haulyards rove in it; sway away, and fid the mast.

Most vessels have no skysail masts, some have their royals to set flying, in which case the stay is spliced into an iron traveller, which is placed *above* the topgallant rigging.

The use of a grommet is to prevent the eyes of the rigging coming over the mast hounds. When the stays are *underneath* the rigging, they serve the same purpose. Sometimes a strop, with a thimble in it for the main royal stay to reeve in, is used instead of a grommet.

The topgallant rigging reeves through the holes in the horns of the crosstrees, and sets up to the spider hoop.

Crossing Yards.

Q. Cross a lower yard.

A. Suppose it to be the fore yard, and that it is on the starboard side of the ship.

Place it with the port yard arm forward. If it be on the port side, place it the contrary way.

Fix a tackle from the fore topmast head to the middle of the yard; make a rope fast to the forward yard arm; sling skids up and down the side; heave away, and when the yard is nearly up to the rail, make a rope fast to the middle of it, to ease it on board. Haul on the line at the yarm arm, and get it under the fore stay; heave away, get the yard across the forecastle, and land it.

Dip the tackle through the collar of the fore stay; make a single block fast to the middle of the yard; hook another block to one of the eye-bolts on the bowsprit; reeve a line through those blocks, and make the end fast to the other side of the bowsprit; the line will thus lead clear of the fore stay.

Take the ends of the lifts through the lift blocks at the cap; reeve the braces, heave away, and when the yard is high enough, steady and place the yard by the lines forwards and the lifts; truss the yard, and shackle on the slings.

Q. Cross a topsail yard.

A. Bring the yard alongside, the same as was done with the fore yard. Bend a yard rope to the slings, and stop it to the forward yard arm; sway away, until the yard is up and down; put on the lifts, and reeve them as soon as it can be done; also reeve the braces. Sway away, cast off the stops, lower the upper lift, and take in the lower one until the yard is square. When the yard is high enough, steady it by the lifts and braces, and parral it. If it be a lower topsail yard, it will have to be trussed, and slung in a manner similar to the lower yard.

Q. Cross a topgallant yard, or a royal yard.

A. Those yards are sent up in a manner similar to a topsail yard.

Their lifts in some cases reeve through a bull's eye seized on the rigging, and come down and make fast to the crosstrees, but they often go with an eye splice over the mast head, so that the upper lift must be put on the yard arm first, and then the yard hoisted chock up so as to get the lower lift on.

Rigging Jib-boom.

Q. Rig out a jib-boom.

A. Reeve the heel rope; heave the jib-boom out a little outside of the cap. If there be no iron band with eyebolts and thimbles in it, put a grommet on the boom, then the foot ropes, then the guys, and then the martingale stay.

Next, put on the flying jib-boom gear in the same order. Reeve the jib stay through the hanks and the hole in the jib-boom; next, reeve the flying jib stay, fore topgallant stay, and fore royal stay. Overhaul all the gear, heave the boom out, secure the heel with the strop and lashing, and set up the gear.

Preparing for Cargo.

Q. Prepare for cargo.

A. If it be a dry and perishable cargo, and the ship be a wooden one, the carpenter should keep the upper works in good order. He should particularly examine the backs of the stanchions, the covering boards, waterways, butts of the deck planks, deck ends, fife rail stanchions, combings, under the windlass and galley, and also the topsides, and bends, down to the water. When battening the hatches down, he should caulk their seams lightly, and put tarred parcelling over the seams; two good tarpaulings must be put over the hatches, and another half-worn one may be put over them, to preserve them from chafe. The coats of the masts should be carefully examined.

The limbers, runs, peeks, and coal-hole should be carefully cleaned. If coal, or other dirty cargo, has been discharged, and a cargo that will damage by dirt has to be taken in, the hold must be thoroughly cleaned, and if necessary washed; but avoid washing, if possible, as water gets into the seams of the ceiling, and causes a dampness which may damage the cargo.

If a timber or deal cargo, or other light goods, be taken, it may be necessary to take in ballast. Take as much ballast as will make the ship sea-kindly; and as some ships go down by the head with light goods, it may be necessary to trim the ship by the stern with the ballast. If wood, or other goods that will not go down the air-ports, be taken, keep the air-ports out, otherwise put them in and secure them, and if the seams of the ceiling be wide, and the cargo can get through them, fill them up with dry fir wood, drove tight in.

Flat-floored, wall-sided ships should be fitted with bilge pumps. The stanchions under the beams must not be removed.

Dunnage.

Q. Lay dunnage for grain or seed.

A. The small spars, rickers, or whatever are used as beams to support the dunnage deals, ought to be laid fair with each other at their upper sides, so that the deals are equally supported. And the deals should be laid close so as to allow no grain to get below the dunnage.

Q. Lay dunnage for tea.

A. Small dry stones are taken in for ballast when about to load tea, and they are used for dunnage, they are levelled fore and aft, and laid to correspond with the shape of the beams athwartships.

Q. If sand ballast, gravel, rattans, brushwood, firewood, &c., are used for dunnage, how should they be laid ?

A. Sand ballast, gravel, or anything that will damage the cargo ought to be covered with boards. Rattans, firewood, &c., should be laid no closer than is necessary to support the cargo, so that there may be room for water, if any gets on to the ceiling.

Avoid horn shavings as dunnage from Calcutta.

Q. How do you lay the dunnage in the bilge ?

A. The dunnage should be carried well up the round of the bilge, especially abreast the foremast; because when the ship heels over, the water dashes up there; also dunnage and mat well abreast of the main-mast, and in the way of the chain plates and pumps.

Q. How do you lay the mats ?

A. Begin amidships and work fore-and-aft, overlap one-third.

Place double mats on the dunnage, round the mast casings, and pump well. Single mats on the sides.

Q. What precautions do you take with the pumps when about to take in grain ?

A. Fit them close through the ceiling, so that no grain can get to them if an accident happen to the pump well.

Also have a clear trunk way to their bottoms.

Q. What further precautions would you take with a grain cargo ?

A. Build strong bulk heads to form peeks at the ends of the ship. Fix strong shifting boards, well secured. Have feeders and ventilators.

If loading at the United States or Canada, the ship must be lined, and loose grain must be stowed in bins, not to contain more than 12,000 bushels each.

Q. What height do you dunnage for grain ?

A. Not less than 10 inches on the floors, and 14 to 16 inches at the bilge. When lined, a water-course between it and the side.

Q. What height for hemp, flax, wool and cotton?

A. Nine inches on the floors, and to the upper part of the bilge, the wing bales of the second tier kept 6 inches off the sides at the lower corner, and 2½ inches at the sides.

Q. What height for tea, flour in barrels, flax, clover, linseed, rice in tierces, and coffee or cocoa in bags?

A. Nine inches at the floors, and 14 inches at the upper part of the bilges.

Q. What precautions should be taken with ships above 600 tons?

A. They should have "'twixt" decks, or platforms laid, to ease the pressure.

Q. Should caulked "'twixt" decks have scuppers in the sides?

A. Yes; and 2½ inches of dunnage laid athwartships, not fore-and-aft, when the cargo is in bags; and not less than 1 inch dunnage when it is in boxes or casks.

Q. How high do you lay the dunnage for entire cargoes of sugar, saltpetre, and guano in bags?

A. Ten inches in the floors, 14 inches at the bilges.

Q. How high do you lay the dunnage for pot and pearl-ashes, tobacco, bark, indigo, madder, gum, &c., whether in casks, cases, or bales?

A. In the bottom, and to the upper part of the bilges, at least 9 inches, and 2½ inches at the sides.

Q. How do you dunnage for miscellaneous goods: such as boxes of cheese, tubs of lard, or other small and slightly-made packages, not intended for broken stowage?

A. Dunnage the same as for other goods.

Q. How do you dunnage at the sides for manufactured goods; also dry hides, bales of silk, or other valuable goods?

A. Dunnage 2½ at the sides, to preserve a water-course.

Mats should be used at the sides for silk, tea, &c.

Remarks.—Flat-floored ships should have bilge pumps, and more dunnage than ships with a good rise of floor.

STOWAGE.

Q. What precautions should you take while loading and discharging?

A. Keep the ship upright and a few inches by the stern, so that the water may come to the pumps. Also keep the cargo spread fore-and-aft, lest it strain the ship. Every evening note the draught of water, and the ton's weight taken in during the day. Pumps carefully attended.

Q. You are about to load tar. Is there any particular precaution you should take?

A. Yes; the flat of the ceiling and to the upper part of the bilge should be caulked, the limber boards taken out, and a three-inch deal laid over the space and fastened to the limber strake, so that a large water-course may be left in case the tar leak from the casks and choke the limber holes. Spirits of tar should be provided to pour down the pumps in case they are likely to choke. Small round-mouthed scrapers, with long handles to scrape the inside of the pumps, should be got. No sand ballast should be left in the ship. Try the pumps repeatedly.

Q. Is there any precaution you should take while loading sugar in casks?

A. Yes. Molasses are apt to leak out of the casks; and if neglected they will choke the pumps. Try the pumps repeatedly.

Q. Should the stanchions be kept in for every cargo?

A. Yes; they should.

Q. You are loading coals for a distant port. There is gas from the coals?

A. Fix ventilators. Keep the hatches off as much as possible.

Q. You are loading grain in bulk?

A. I would not allow it to come in too fast. Pour it through a canvass hose, to prevent dust from rising as much as possible. Watch that the grain does not get under the mats. If necessary, trample it well. Be very careful that it is well trimmed under the beams and decks.

Q. How much grain can you take in bulk at New York?

A. No vessel exceeding 400 tons register can be load with grain in bulk.

Exceeding 400 tons, and not over 500 tons, two-thirds in bulk one-third in bags. Over 500 tons, half in bulk half in bags.

Q. You are loading timber or deals?

A. Be particular that the ends of the timber, or deals, are a few inches clear of the ship's ceiling, especially forward and aft; and also that the hold beams do not bear any of the weight.

Wedge the cargo under both hold and deck beams.

Q. You are taking mast pieces in?

A. Take them in with a strop, and pinch them with handspikes. If dogs and crowbars be used, they will damage the masts.

Q. You are taking in very long mast pieces for China junks at Singapore. You have only one bow port.

A. It may be necessary to lift the foremast, in order to get some of the long spars to the other side of the ship.

Q. In loading timber, where do you stow the heaviest?

A. At the bottom of the ship.

Q. You are loading a cargo of heavy goods?

A. Raise them well up; otherwise the ship will be laboursome.

Keep both ends clear of heavy cargo.

Q. How do you stow bar iron?

A. Grating fashion. Bring it up to a point in 'midships. Protect the sides of the ship with bars laid fore-and-aft.

Q. How do you stow machinery?

A. The heavy parts first; chock and secure them well.

Q. How do you stow iron ore, or copper ore?

A. Some ships are properly adapted for this trade by having a trunk way built for the cargo. If the ship is not properly adapted, raise the cargo well up and bring it to a point towards the main hatchway.

Q. If the cargo does not fill the ship, what must be done?

A. Secure the cargo by planks on it, and strong shores to the sides and beams.

Q. In loading any cargo that is stowed in tiers, such as timber, deals, sugar in boxes or casks, tea in chests, and so on, how do you lay the lower tier?

A. Lay the lower tier so that there may need no broken stowage under the beams. In stowing casks. Let the bilge of one cask lie against the two ends that touch each other of the casks alongside of it, and the bilges of the second tier in the hollow spaces of the first tier.

Q. Where should acids be carried?

A. On deck, ready to throw overboard.

Q. Should stowers be allowed to handle goods in bales or bags with hooks?

A. No; lest they damage the goods.

Q. How do you stow bale goods?

A. Marks and numbers uppermost. On their flats in 'midships, and on their edges in the wings.

Q. How should oils, wine, spirits, beer, molasses, tar, &c., in casks be stowed?

A. Bung up and bilge free; good cross beds at the quarters; do not trust to hanging beds; and to be well chocked with wood. In loading brandy at France, even small ships, say 250 tons, must have a platform laid on their beams to preserve the lower tiers from too much pressure.

Q. How many heights are allowed?

A. Three heights of pipes or butts, four of puncheons, and six of hogsheads or half puncheons.

Barrels of provisions and casks of tallow allowed to stow six heights.

Tar, turpentine, rosin, &c., to stow six heights.

Q. How many gallons are there in each ?

A. Pipe or butt 126 gallons. Puncheon 84. Hogshead 63.

Q. Where would you stow moist goods and liquids, such as salted hides, bales of bacon, butter, lard, grease, castor oil, &c. ?

A. Not too near any goods whose nature is to absorb moisture.

Q. You are loading a general cargo. Consisting partly of rough and hard goods, such as coals, grindstones, metals, bundles of sheet iron, iron rods, pigs of copper or iron, &c. And partly of goods in bags or bales, which are liable to be chafed, or damaged by contact with rough goods. How would you stow the goods ?

A. The rough goods in general underneath, and forward of the fine goods, and separated from them by boards or dunnage.

Q. How would you stow brittle goods, such as glass, bottles, earthenware, &c ?

A. In a place by themselves, with plenty of straw.

Q. How would you stow goods in casks and goods liable to damage from leakage of the casks ?

A. Keep the goods liable to damage above the casks, or forward, or aft of them.

You are in a steamer which is loading a general cargo for different ports. How would you stow the goods ?

A. Keep the goods intended for the first port uppermost, if possible, and so that the ship will be on a trim when they are taken out. Note what hold, and what part of that hold, every merchant's goods are in.

Q. Where would you stow bullion ?

A. In the bullion room under the cabin deck.

Q. You are loading a general cargo, and a lighter of petroleum, turpentine, or similar strong-smelling goods comes alongside. What would you do with it ?

A. Refuse to take it in ; for the vapour from the petroleum, turpentine, &c., would spoil flour, or food of any kind, for either man or beast. Call the captain's attention to it.

Getting Ready for Sea.

Q. The ship is load; get ready for sea?

A. Batten the hatches down, and secure everything that is loose and is not wanted in going out. Get up the towline, warps, lines, and cork fenders. See that the lamps and compasses are in order, that no loose iron is near the binnacle, that the wheel chains and rudder are in order, and that an anchor and chain are ready. In a steamer see that there are no ropes near the propeller, and that in going out the propeller does not strike the dock side.

Log Line and Log Glass.

Q. What is the short short rule for to find the length of a knot corresponding to the time measured by a log glass?

A. Affix a cipher to the seconds, divide by 6, the quotient will be the length in feet.

If there be a remainder, affix a cipher, and divide as before. Multiply the decimal part by 12, and the product will be inches.

Q. What is the long rule?

A. Multiply the seconds by 76, and divide the product by 45.

Q. Give an example in both ways, the time by the glass being 80 seconds?

A. Short way:

sec.
6)800
—
Answer...50 feet.

Long way:

sec. sec. feet.
3600 : 80 :: 6080
45 76 76

45)2280(50
225
—
80
12
—
45)960(8
360
—
feet inches
Answer...50 8

Note.—The rule is derived from contracting the rule of three statement.

Q. A glass runs 28 seconds; required the length of a corresponding knot.

	feet	inches
Answers.—Short way...	46	8
Long way...	47	8¼

The Lead and Lead Line.

Q. How do you mark the hand lead line?

A. At two fathoms.....leather, with two parts sticking out.
,, three ,, ...leather, slit so that three parts stick out.
,, five ,, ...white bunting, or rag.
,, seven ,, ...red bunting.
,, ten ,, ...leather, with a round hole.
,, thirteen ,, ...blue bunting.
,, fifteen ,, ...white bunting.
,, seventeen ,, ...red bunting.
,, twenty ,, ...a piece of cord with two knots.

The hand lead line is not marked farther than twenty fathoms.

Q. How do you mark the deep sea lead line?

A. The deep sea lead line is marked in the same way as far as twenty fathoms; at thirty fathoms it is marked with three knots; at forty fathoms with four knots; and so on, an additional knot at every ten fathoms. Every intermediate five fathoms, above twenty, is marked with one knot, or with a piece of leather.

Q. Take a cast of the hand lead?

A. I would be careful not to overheave it, especially the first cast.

Q. When would you stop the line from running out?

A. As soon as the ship by her motion brought me over the lead.

Q. You are about to make the land. It is deep water. Take a cast?

A. Stop the ship's way by stopping the engine; or by reducing sail and rounding to.

Q. It is a dark night, and you cannot see the marks, how do you know the soundings?

A. Deep cast. Take the line to a light. Shoal cast. Count the marks from the lead, till I come to say the 5 or 7-fathom mark, take that

mark in my left hand, heave the lead, keep my fingers close to the line so that I can feel any other marks that go out, but not so close as to stop the line. When soundings are struck, allow for the distance of the mark above the surface of the water.

Q. You are about to make the land. It comes on a fog?

A. Keep the ship under command, proceed cautiously, and sound very often.

Management of a Sailing Ship at Sea.

Q. It is coming on to blow fresh, take in the light upper sails; say the royals or topgallant sails?

A. Send a hand or two up aloft ready to pick the sail up; lower the haulyards; haul up the lee clueline and buntline; then the weather ones; as soon as the lee sheet is started, haul in the weather brace, and spill the sail.

Q. You are caught in a squall?

A. Take in the mizen, and keep the ship before the wind; see that the ropes are clear of the rudder; clue up, haul down, haul the yards by, and stow as fast as possible.

Q. You are taken aback?

A. Take in the mizen, shiver the cross-jack yard, and the main yard; when the ship falls off, fill the fore yard.

Q. You are running, reef the topsails?

A. Keep the ship before the wind. Reef the fore topsail first; then take the fore yard forward, so that the ship will lie on the course on which she will be most easy; haul the main sail up; haul the main yard by, and reef the main topsail; watch the helmsman while the crew are reefing.

Q. The wind is abeam?

A. Lay the topsail yard parallel with the lower yard, or nearly so, and reef the sail.

It may be necessary to reef one sail, and set it before reefing the other, in order to keep the ship quiet. In some cases, it is necessary to start the topsail sheets.

Be particular that the yard is laid to pass before the men go aloft; if not, they may have to go out by the lifts, and in by the reef tackles, while the sail is slatting about in a most dangerous manner.

Q. Reef a course?

A. In order to reef a course, it is generally necessary to haul the sail up as for stowing.

Q. Take in a course?

A. Haul tight the lower lifts; ease off the lee sheet a few feet; man the buntlines and leech lines; haul them well tight; ease away the tack; haul up the weather clue garnet, buntlines, and leechlines; then ease off the lee sheet, and haul up the lee clue garnet, and all the gear.

Some experienced men consider it better to haul the lee clue garnet close up before starting the tack.

Q. Sometimes a foresail is carried so long upon a ship, that it is very difficult to stow it; the sail blows out of the men's hands before they can get the gaskets passed; they are then placed in great danger?

A. In such a case, it would be well to have three or four lines passed from the deck, over the yard, under the sail, and the ends made fast to the yard, before either tack or sheet is started. After the sail is hauled up by its gear, haul up those lines, and they will spill the sail, and keep it quiet until the gaskets are passed.

Q. Take in the jib?

A. Keep the ship before the wind; haul the sail down, and stow it; then keep the ship on her course.

Q. Clue up a topsail in a gale of wind?

A. Haul the weather clueline up first, then man the buntlines and lee clueline.

Q. Take in the mizen?

A. Lower it down; do not brail it up.

Q. You are scudding?

A. Be careful with the helm; have the relieving tackles ready; the wheel chains should be rather tight; the ship should be under close-reefed topsails, reefed foresail, and fore topmast staysail with its sheet hauled flat aft.

Q. It is blowing a gale ; lay the ship to ?

A. After taking the foresail off the ship, watch for a smooth, and when you have got one, haul the main yard forward, and bring the ship to as quick as possible ; haul tight the lower lifts, ease off the lee sheet first, and stow the fore topsail.

The ship should be laid on the tack on which she will take the sea most easy. It is well to forereach under close-reefed topsails, and low fore-and-aft sail, when it can be done.

Remarks.—The writer was conversing with two of his friends ; they were both experienced men, and had been for a considerable time exposed to extremely heavy weather in crossing the Bay of Biscay ; many a time, when night closed in upon them, they did not expect to see the morning. One of them attributed his safety to laying his ship to under a balanced reefed trysail ; the ship had no head way, so that her wake was right to windward of the ship, thus causing a comparative smooth ; ahead and astern of the ship, the waves were breaking in a most dangerous manner.

Q. Shift sails in a gale of wind ?

A. The sail must be kept as quiet as possible ; thus, if it be a top-sail, lay the sail to pass for bending ; tie a few of the close reef points round the foot, then a few of the second reef points, and so on. Send the sail up ; pass the first reef earring, and tie the points ; take in as many reefs as are necessary, and set the sail ; it can be properly bent when the weather falls fine.

Q. Shake out a reef ?

A. Settle the haulyards a little, and haul upon the reef tackles ; two men must loose the points, beginning at the bunt, and going outwards ; see that the points are not jammed between the yard and rigging before the earrings are eased off.

Q. When is a ship liable to miss stays ?

A. In moderate weather, and smooth sea, a loaded ship will very rarely miss stays, neither will a light one do so if due care be taken. In blowing weather, with strong sea, or in light winds, they often do miss stays.

Q. Tack against a strong sea, blowing hard ?

A. Keep the ship well full, watch a smooth, ease the helm down, haul down the jibs, haul in the spanker sheet ; when the ship is head to wind, and loses her head way, check the fore bowline and fore braces,

and shift the helm into amidships; when the wind is about half a point on the other bow, so that it is certain the ship will come round, mainsail haul. In ordinary cases, mainsail haul before the wind comes right ahead.

Q. Wear ship?

A. Brail up the spanker, shiver nearly the after square sails, keep them lifting full, put the helm up. When it is blowing hard, it is advisable to haul down the fore-and-aft sails when the ship is before the wind; square the foreyard, and bring the ship to the wind; trim the sails.

Q. The ship has come up in the wind, it is light?

A. Put the helm up, ease off the spanker sheet, and flatten in the head sheets.

If the ship does not fall off: Box her off, by letting go the lee fore braces and fore bowline, and hauling in the weather braces.

Q. Make a stern board?

A. If the ship be under low canvas, say double-reefed topsails, fore topmast staysail, foresail, and trysail: Haul the foresail up; take in the trysail. Put the helm down; when the ship comes up in the wind, square the after yards; when the ship gathers head way, shift the helm, and proceed as in wearing.

Q. The ship has been close hauled, and has come round; get her short round on her heel?

A. Put the helm down, brail up the spanker, shiver the after sails; as soon as the ship pays off far enough, fill the fore yard, and shift the helm.

Q. What are the proper sails for backing and filling in a tide way?

A. Two topsails and spanker; it is often practised under the main topsail.

Put the helm down, and lay the ship broadside on to the tide, with her head towards the weather shore. When she is in the middle of the stream, square the yards so that the wind may have little effect on them; thus the ship will drift faster.

If she draw towards the shore ahead, haul all flat aback and haul in the spanker sheet, and thus force the ship astern. If she draw towards the shore astern, fill on her.

Q. Your ship is on a lee shore, there is anchorage, she will not stay, and there is not room to wear; how can you get her on the other tack?

A. Club haul her as follows: Get the lee anchor ready and a spring on it from the lee quarter, and have the chain ready for slipping.

Put the helm down as in tacking ship, and when the vessel loses headway, let go the anchor, and mainsail haul; as soon as the anchor brings the ship head to wind, slip the chain, and hold on the spring until the sails fill, then cut the spring.

Q. It is your watch. What would you do?

A. Pay particular attention to the captain or chief mate's orders. Keep a bright look out myself, and make others do the same. Keep a watchful eye on the helmsman. Be particular with the pumps. At night time be very careful to have the ship's lights in order.

Q. It is coming on dark?

A. Look carefully round the decks, and aloft, examine the mast coats and tarpaulins, secure everything that is loose, parcel any rope that may be likely to chafe through the night.

Q. It is breaking day?

A. Go aloft and examine everything there, do the same about the deck, repair any damage that may have occurred during the night.

Management of a Steamer at Sea.

Q. Are the sails much benefit to a steamer?

A. Yes, they steady the vessel and ease the pressure on the engine.

Q. The wind comes strong ahead, and raises a heavy sea?

A. Report to the captain, and ask him if he will allow the engines to be eased, and the ship kept off her course a point or two, so that she may take the sea easy.

Q. The ship is rounding a point, a strong tide is running, and other ships are coming the opposite way?

A. Be very attentive.

Q. You are about to make the land, or nearing shoals, it is a hazy night, and the ship's position is not certain?

A. Keep on the safe side, steer an outerly course, pay great attention to the lead, look-out and compasses; and if possible keep the ship upright to avoid heeling deviation.

Q. In a steamer. Engine broke down. Or in a sailing ship. Masts gone. Heavy sea, contrary wind. How do you keep the ship quiet?

A. Rig a sea anchor, ride by a spar, or pay out chain, to keep the ship's head on to sea.

Anchor Lights.

Q. What light must be shown by either sailing ships or steamers at anchor?

A. A white light in a globular lantern of 8 inches diameter. (Art. 7.)

Q. Where is the anchor light to be exhibited?

A. Where it can be best seen. (Art. 7.)

Q. At what height?

A. Not more than 20 feet above the deck. (Art. 7.)

Q. In what direction must it show?

A. All round the horizon. (Art. 7.)

Q. At what distance must it be visible?

A. At least one mile. (Art. 7.)

Sailing Ships' Lights Under Weigh.

Q. What lights must sailing ships carry when under weigh at night?

A. Two. *Green* to starboard. *Red* to port. (Art. 5.)

Q. How are those side lights fixed, and how far should they be seen?

A. Fixed so as each to shew over 10 points: from right ahead to 2 points abaft the beam on each side.

Seen. At least two miles. (Arts. 3 & 5.)

Q. Are the side lights to be fit with screens. If so, how?

A. Yes. On the inboard side.

At least three feet from the light forward.

So placed that the lights cannot be seen across the bows. (Arts. 3 and 5.)

Steam Ships' Lights Under Steam.

Q. What lights have steamers to carry when under steam at night?

A. Three. *White* at foremast head. *Green* to starboard. *Red* to port. (Art. 3.)

Q. Over how many points, in what direction, and how far should the mast head light show?

A. Over 20 points. From right ahead to 2 points abaft the beam on both sides. Visible at least 5 miles. (Art. 3 *a*.)

Q. Is there any distinction between a steamer's side lights and a sailing ships?

A. There is none. (Art. 5.)

Q. What lights are steam ships required to carry when towing other ships?

A. An additional white light under the fore mast head light; and of exactly the same kind as it. (Art. 4.)

Q. When steam ships are laying down telegraphic cables, what lights must they carry?

A. The same three lights as other steamers, and in addition two Red lights under the foremast head light, and about four feet apart.

Q. When steamers are not under steam, but are under sail only?

A. Side lights only, the same as sailing vessels. (Art. 1.)

Exceptional Lights. Small Vessels. Pilot Vessels. Fishing Boats.

Q. Small vessels, bad weather, lights cannot be fixed?

A. Keep each light on deck on its respective side, ready for instant exhibition when coming near another vessel.

The lanterns should be painted the colour of the light they contain. (Art. 6.)

Q. What lights must sailing pilot vessels carry?

A. A White light like an anchor light, and to burn a flare-up every 15 minutes. (Art. 8.)

Q. What lights are open boats and fishing boats to carry?

A. A lantern with a green and red slide. (Art. 9.)

Q. When fishing vessels and open boats are at anchor, or attached to their nets and stationary, what lights must they exhibit ?

A. Two vertical white lights.

Q. If a vessel is forced to anchor on drift net fishing ground, what lights must she show ?

A. Two horizontal white lights, 8 feet apart.

Q. May open boats use a flare-up ?

A. Yes.

Q. Is this flare-up instead of the lantern with the coloured slides. Or is it in addition to it ?

A. It is in addition to the lantern with coloured slides.

Fog Signals.

Q. You are at anchor in a fog, in either steamer or sailing vessel ?

A. Ring a bell at least every 5 minutes. (Art. 10 *c.*)

Q. You are under weigh in a sailing ship ; it is a fog ?

A. Blow a fog horn at least every 5 minutes. (Art. 10 *b.*)

Q. What other precautions can you take ?

A. Keep the ship under easy sail. And, if in soundings, frequently take a cast of the lead.

Q. You are in a steamer, under steam, in a fog ?

A. Blow the steam whistle at least every 5 minutes. Go slow.

Q. At what height above the deck, and where is the steam whistle to be placed ?

A. Not less than 8 feet above the deck. Before the funnel.

REGULATIONS FOR PREVENTING COLLISIONS AT SEA.

Preliminary.

Art. 1. In the following Rules, every Steam Ship which is under Sail, and not under Steam, is to be considered a Sailing Ship ; and every Steam Ship which is under Steam, whether under Sail or not, is to be considered a Ship under Steam.

Rules Concerning Lights.

Art. 2. The lights mentioned in the following Articles, numbered 3, 4, 5, 6, 7, 8, and 9, and no others, shall be carried in all Weathers, from Sunset to Sunrise.

Art. 3. Seagoing Steam Ships when under weigh shall carry:

(*a*) *At the Foremast Head*, a bright White Light, so fixed as to show an uniform and unbroken Light over an Arc of the Horizon of 20 Points of the Compass; so fixed as to throw the Light 10 Points on each Side of the Ship, viz., from right ahead to 2 Points abaft the Beam on either Side; and of such a Character as to be visible on a dark Night, with a clear Atmosphere, at a Distance of at least Five Miles:

(*b*) *On the Starboard Side*, a Green Light so constructed as to show an uniform and unbroken Light over an Arc of the Horizon of 10 Points of the Compass; so fixed as to throw the Light from right ahead to 2 Points abaft the Beam on the Starboard Side; and of such a character as to be visible on a dark Night, with a clear Atmosphere, at a Distance of at least Two Miles:

(*c*) *On the Port Side*, a Red Light, so constructed as to show an uniform and unbroken Light over an Arc of the Horizon of 10 Points of the Compass; so fixed as to throw the Light from right ahead to 2 Points abaft the beam on the Port Side; and of such a Character as to be visible on a dark Night, with a clear Atmosphere, at a Distance of at least Two Miles;

(*d*) The said Green and Red Side Lights shall be fitted with inboard Screens, projecting at least Three Feet forward from the Light, so as to prevent these Lights from being seen across the bows.

Art. 4. Steam Ships, when towing other Ships, shall carry Two bright White Mast-head Lights vertically, in addition to their Side Lights, so as to distinguish them from other Steam Ships. Each of these Mast-head Ltghts shall be of the same Construction and Character as the Mast-head Lights which other Steam Ships are required to carry.

Art. 5. Sailing Ships under weigh, or being towed, shall carry the same Lights as Steam Ships under weigh, with the exception of the White Mast-head Lights, which they shall never carry.

Art. 6. Whenever, as in the case of small vessels during bad weather, the Green and Red Lights cannot be fixed, these Lights shall be kept on deck, on their respective sides of the vessel, ready for instant exhibition; and shall, on the approach of or to other vessels, be exhibited on their respective sides in sufficient time to prevent collision, in such manner as to make them most visible, and so that the Green Light shall not be seen on the Port Side, nor the Red Light on the Starboard Side.

To make the Use of these portable Lights more certain and easy, the Lanterns containing them shall be painted Outside with the Colour of the Light they respectively contain, and shall be provided with suitable Screens.

Art. 7. Ships, whether Steam Ships or Sailing Ships, when at anchor in Roadsteads or Fairways, shall exhibit, where it can best be seen, but at a Height not exceeding Twenty Feet above the hull, a White Light, in a globular lantern of eight inches in diameter, and so constructed as to show a clear, uniform, and unbroken Light, visible all round the horizon, and at a distance of at least One Mile.

Art. 8. Sailing Pilot Vessels shall not carry the Lights required for other Sailing Vessels, but shall carry a White Light at the Mast-head, visible all round the Horizon,—and shall also exhibit a Flare-up Light every Fifteen Minutes.

Art. 9. Open Fishing Boats and other open Boats shall not be required to carry the Side Lights required for other vessels; but shall, if they do not carry such Lights, carry a Lantern having a Green Slide on the one side and a Red Slide on the other side; and on the approach of or to other vessels, such Lantern shall be exhibited in sufficient time to prevent collision, so that the Green Light shall not be seen on the Port Side, nor the Red Light on the Starboard Side.

Fishing Vessels and open Boats when at anchor, or attached to their nets and stationary, shall exhibit a bright White Light. By the Sea Fisheries' Act, 1868, Fishing Boats with drift nets are required to carry Two Lights vertically on one of their masts, at a distance of Three Feet apart.

Fishing Vessels and open Boats shall, however, not be prevented from using a Flare-up in addition, if considered expedient.

Rules Concerning Fog Signals.

Art. 10. Whenever there is fog, whether by Day or Night, the Fog Signals described below shall be carried and used, and shall be sounded at least every Five Minutes, viz.:—

(*a*) Steam Ships under weigh shall use a Steam Whistle placed before the funnel, not less than eight feet from the deck:

(*b*) Sailing Ships under weigh shall use a Fog Horn:

(*c*) Steam Ships and Sailing Ships when not under weigh shall use a Bell.

Steering and Sailing Rules.

Art. 11. If two Sailing Ships are meeting end on, or nearly end on, so as to involve risk of Collision, the Helms of both shall be put to Port, so that each may pass on the Port side of the other.

Art. 12. When two Sailing Ships are crossing so as to involve risk of collision, then, if they have the wind on different sides, the ship with the wind on the Port side shall keep out of the way of the ship with the wind on the Starboard side; except in the case in which the ship with the wind on the Port side is close hauled, and the other ship free, in which case the latter ship shall keep out of the way; but if they have the wind on the same side, or if one of them has the wind aft, the ship which is to windward shall keep out of the way of the ship which is to leeward.

Art. 13. If two Ships under Steam are meeting end on, or nearly end on, so as to involve risk of collision, the helms of both shall be put to port, so that each may pass on the Port side of the other.

Art. 14. If two Ships under Steam are crossing so as to involve risk of collision, the ship which has the other on her own Starboard side shall keep out of the way of the other.

Art. 15. If two Ships, one of which is a Sailing Ship, and the other a Steam Ship, are proceeding in such directions as to involve risk of collision, the Steam Ship shall keep out of the way of the Sailing Ship.

Art. 16. Every Steam Ship, when approaching another Ship so as to involve risk of collision, shall slacken her speed, or, if necessary, stop and reverse; and every Steam Ship shall, when in a fog, go at a moderate speed.

Art. 17. Every vessel overtaking any other vessel, shall keep out of the way of the said last-mentioned vessel.

Art. 18. Where, by the above rules one of two ships is to keep out of the way, the other shall keep her course, subject to the qualifications contained in the following Article.

Art. 19. In obeying and construing these Rules, due regard must be had to all Dangers of Navigation; and due regard must also be had to any special circumstances which may exist in any particular case rendering a departure from the above Rules necessary in order to avoid immediate danger.

Art. 20. Nothing in these Rules shall exonerate any Ship, or the Owner, or Master, or Crew thereof, from the consequences of any neglect to carry Lights or Signals, or of any neglect to keep a proper look-out, or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

Whereas there has been doubt or misapprehension concerning the effect of the said two articles:

And whereas the Admiralty and the Board of Trade have jointly recommended to Her Majesty to make the following additions to the said regulations for the purpose of explaining the said recited articles, and of removing the said doubt and misapprehension:

Now, therefore, Her Majesty, by virtue of the powers vested in Her by the said recited Act, and by and with the advice of Her Privy Council, is pleased to make the following additions to the said regulations by way of explanation of the said two recited articles; that is to say,

The said two articles, numbering 11 and 18 respectively, only apply to cases where ships are meeting end on, or nearly end on, *in such a manner as to involve risk of collision.* They consequently do not apply to two ships which must, if they both keep on their respective courses, pass clear of each other.

The only cases in which the said two articles apply are when each of the two ships is end on, or nearly end on, to the other; in other words, to cases in which *by day* each ship sees the masts of the other in a line, or nearly in a line, with her own; and *by night* to cases in which each ship is in such a position as to see both the side lights of the other.

The said two articles do not apply *by day* to cases in which a ship sees another *ahead* crossing her own course; or *by night* to cases where the red light of one ship is opposed to the red light of the other; or where the green light of one ship is opposed to the green light of the other; or where a red light without a green light, or a green light without a red light, is seen ahead; or where both green and red lights are seen anywhere but ahead.

AIDS TO MEMORY, IN FOUR VERSES.

By Thomas Gray.

Q. Repeat Aids to Memory in Four Verses?

A. 1. *Two Steam Ships meeting.*

When both side Lights you see ahead—
Port your helm, and show your RED.

2. *Two Steam Ships passing.*

GREEN to GREEN—or, RED to RED—
Perfect safety—Go ahead!

3. *Two Steam Ships crossing.*

Note.—This is the position af greatest danger; there is nothing for it but good look-out, caution, and judgment.

If to your starboard RED appear,
It is your duty to keep clear;
To act as judgment says is proper:—
To Port—or Starboard—Back—or, Stop her!

But when upon your Port is seen
A Steamer's Starboard Light of Green,
There's not so much for you to do.
For GREEN to Port keeps clear of you.

4. *All Ships must keep a good look-out, and Steam Ships must stop and go astern, if necessary.*

Both in safety and in doubt
Always keep a good look-out;
In danger, with no room to turn,
Ease her!—Stop her!—Go astern!

Q. *Repeat Short Rules derived from the preceding verses for Steamers?*

Both side Lights ahead—
Show your RED.

GREEN to GREEN—or, RED to RED—
Go ahead!

If to Starboard RED appear,
Keep clear.

To port is seen,
GREEN.

In danger,
Stop her!
Go astern!

Q. Give short rules for sailing ships, founded on Articles 11 and 12?

A. Art. 11. *Two Sailing Ship meeting end on.*

PORT.

Art. 12. *Two Sailing Ships crossing. Wind on different sides.*

PORT TACK GIVE WAY.

Except port tack close hauled, the other free, then

SHIP FREE GIVE WAY.

Wind on the same side, or one with the wind aft.

SHIP TO WINDWARD GIVE WAY.

Q. You are in a steamer, going down Swin. Dark night, fair wind, blowing hard, a large fleet of sailing ships are turning up. Give a short rule for passing under their sterns when necessary?

A. Show Green to Green—or, Red to Red.

EXERCISES IN THE RULE OF THE ROAD.

Q. When, by the Rules, one of two ships has to keep out of the way, what has the other to do?

A. Keep her course.

Q. Any qualification or exception to this?

A. Yes. Due regard must be had to all dangers of navigation, and to any special circumstances which may exist in any particular case.

Q. What general direction is there in the steering and sailing rules?

A. Nothing in the rules shall exonerate any ship, owner, master, or crew, from the consequences of any neglect to carry lights or signals, or neglect to keep a proper look-out, or neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

Q. What does the Act of Parliament provide as to the obligation of owners and masters in obeying the regulations respecting lights, fog signals, and steering and sailing rules?

A. It provides that they shall obey the regulations. And also, in case of default, they shall be guilty of a misdemeanour.

Q. What do breaches of the regulations imply?

A. Wilful default of the person in charge of the deck, unless special circumstances made the breaches necessary.

Q. If collision ensue from a breach of the regulations, who is to be deemed in fault?

A. The person by whom the breach of the regulations is made.

Q. In case of collision, what would you do?

A. Get clear as soon as possible, ascertain what damage I had received, and whether the ship was making water.

Q. What next?

A. Give what assistance I could to the other ship. Give her my ship's name and port of registry, and ask her name and port of registry.

Q. Is one ship bound to assist another in case of collision?

A. Yes; without there is a reasonable excuse.

Q. What is the penalty you will suffer for default when you have charge of the deck?

A. The collision is to be deemed to be caused by me.

Q. Is there any other penalty attaches to not rendering assistance?

A. My certificate may be suspended, or cancelled.

Q. Should you understand the regulations before you take charge of the deck of a ship?

A. I should; for if I do not, and am guilty of default, the consequences may be very serious both to me and to other people.

Q. You see a light ahead, or nearly ahead. Does the Rules of the Road require you to port in all cases?

A. Not in all cases; only in two, viz., Art. 11. Two sailing ships meeting end on, or nearly end on. Both port.

Art. 13. Two steamers meeting end on, or nearly end on. Both port.

Q. Do the regulations apply to sea-going ships in harbours and in rivers?

A. Yes; unless there is a rule to the contrary made by a competent authority.

Q. Do they apply to British ships only?

A. They apply to foreign ships also.

Q. When did the present regulations come into operation?

A. On 1st June, 1863.

Q. Where are the present regulations to be found?

A. In the "Merchant Shipping Act Amendment Act, 1862."

Exercises in Articles 13, 14, 15, *and* 16.

Q. You are in a steamship A, and see the red light of another ship B, on your port side, or port bow. What does it denote; and what must you do?

A. It denotes that the port side of a sailing ship is towards me.

I must keep my course. Red to Red.

Q. You see a white light above the red, on your port side, or port bow?

A. Port side of steamer towards me.

Keep my course. Red to Red.

Q. You see a green light on your starboard side, or starboard bow?

A. Starboard side of sailing ship towards me. Keep my course. Green to Green.

Q. You see a white light above the green on starboard side or bow?

A. Starboard side of steamer. Keep my course.

Q. You see a red light to starboard?

A. A sailing ship crossing from starboard to port. Keep clear. Art. 15.

Q. You see a white light above the red to starboard?

A. A steamer crossing from starboard to port. Keep clear. Art. 14.

Q. You see a green light to port?

A. A sailing ship crossing from port to starboard. Keep clear. Art. 15.

Q. You see a white light above the green to port?

A. A steamer crossing from port to starboard. Keep my course; watch her, if danger, stop, go astern. Arts. 14 and 18.

Q. It is hazy. You see a green and a red light in any direction?

A. A sailing ship coming direct towards me. Keep clear.

Q. You see a white light above the green, and red in any direction?

A. A steamer coming direct towards me.

Q. Which ship keeps out of the way?

A. The ship which has the other on her own starboard side. Art. 14.

A. You see a white light above green and red ahead?

A. A steamer end on. Port.

Q. You are overtaking another ship?

A. Keep clear.

Q. Another ship is overtaking you ?

A. Show a white light over the stern. Blow the whistle.

Q. A sees B's red light bearing N.E. How is B steering ?

A. From near S.W., round by west to N.N.W. ?

Q. Why ?

A. Because, if B's screens are properly fitted, these are the only ten points in which her red light can be seen when it bears N.E.

Q. A sees B's green light bearing N.E. How is B steering.

A. From near S.W., round by south to E.S.E.

Q. Why ?

A. Because, if B's screens are properly fitted, these are the only ten points in which her green light can be seen when it bears N.E.

Q. You are steering, say north, and make out a red light, either steamer or sailing ship, on your starboard side, bearing, say N.E. The light continues on that bearing ?

A. There will be a collision.

Q. The other vessel's light alters its bearing to more ahead ?

A. She will likely go ahead of me.

Q. It alters to more abeam or astern ?

A. I will likely go ahead of her.

Q. You are steering, say N.W., and see a green light on your port side. It bears west ?

A. If it continue on that bearing.
There will be a collision.
If it draw ahead.
The other ship will go ahead.
If it draw astern.
I will go ahead.

Q. Which side of a river must a steamer keep ?

A. Her own starboard side of mid channel.

Exercises on Articles **11** *and* **12.**

Q. You have charge of the deck of a sailing ship ; it is night time, dark, hazy, strong tide with you, meeting a fleet of both steamers and sailing ships, and passing a fleet of ships at anchor ?

A. Have the ship under such sail, that she is under perfect command, and can quickly be brought to the wind without any risk of damage.

Q. You meet a fleet of steamers ?

A. Keep my course.

Q. Any exception to this ?

A. Yes. By Art. 19. Due regard must be had to all dangers of navigation, and due regard must be had to any special circumstances which may exist in any particular case, rendering a departure from the above rules necessary, in order to avoid immediate danger.

Q. A steamer thinks he can cross you, but when it is too late to go under your stern, he finds he cannot cross you, can you do anything to avoid collision ?

A. Yes. Hard a port, or hard a starboard. Show Green to Green ; or, Red to Red, or heave my ship into the wind, as the case may require.

Q. You meet a fleet of sailing ships ?

A. Consider what those sailing ships can do, and what they probably will do in the various cases that may occur.

Q. You see a white light ?

A. Probably a ship at anchor ; if so, keep clear. It may be the mast head light of a steamer, with coloured lights invisible ; or it may be a pilot cutter's light.

Q. You are running ; a fleet of sailing ships are coming the other way ?

A. They must be turning. Keep clear. If not certain of crossing them, go under their stern. Show Green to Green ; or, Red to Red, as the case may require.

Q. You think you will cross the bow of a green light on your port bow ; but, when it is too late to go under his stern, you find you cannot cross him ?

A. Hard a port, foreyard forward, let him pass to leeward of me.

Q. You see a red light anywhere on your port side ?

A. Red to Red. Go ahead.

Q. You see a green light anywhere on your starboard side ?

A. Green to Green. Go ahead.

Q. What position of the Green or Red shews danger ?

A. Green to port, or Red to starboard, shews danger.

Q. A is a sailing ship, close hauled on port tack; B is a sailing ship close hauled on starboard tack.

A. A, being on port tack, gives way.

Q. A and B meet end on?

A. Both port.

Q. A is free. B close hauled?

A. A gives way.

Q. A is close hauled. B is free?

A. B gives way.

Q. Both ships free. A wind on port side. B on starboard side?

A. A gives way.

Q. Both ships on same tack. A to windward?

A. A keeps clear.

Q. A has the wind aft. B has it on the beam?

A. A keeps clear.

Q. A is on port tack, B on starboard tack, both close hauled. How does A know whether she will weather B?

A. By taking a mark ahead of B.

If the mark open by B, A will weather B. If it closes, or does not open, A will not weather B.

Q. A thinks that she will weather B; but, when it is too late to give way, finds that she cannot. What must both ships do?

A. Both tack ship.

Q. Night time. A and B are turning. A on port tack sees B's red light on starboard tack. How does A know that she will weather B?

A. By A taking the bearing of B.

If B's bearing draw more astern, A will weather B.

If B's bearing do not alter, or it draw more ahead, A will not weather B.

Commercial Code of Signals.

Q. How many Code Signals are there?

A. 18, and in addition a Code Pennant.

Q. What kind are they?

A. 1 Burgee, 4 pennants, and 18 square flags.

Q. Name them, or point them out?

A. B is the *Burgee.*
C ,, Clear (or White) Pennant
D ,, Dark (or Blue) ,,
F ,, Fiery (or Red) ,,
G, H, J, K, L, M, N } must be learnt by heart.
P ,, Peter.
Q ,, Quarantine. Yellow Flag.
R ,, Red (Cross).
S ,, Spot White.
T ,, Tricolor.
V, W } must be remembered.

Q. What is the code signal for?

A. It is shewn under the ensign whilst signalling, to indicate that the signal is by the commercial code; hoisted by itself, it is the answering pennant.

One Flag Signal.

Q. What does the pennant C mean when it is hoisted by itself?

A. Yes.

Q. What is the meaning of the pennant D by itself?

A. No.

Two Flag Signals.

Q. Two flags. Burgee uppermost.

A. Attention signal.

Q. Two flags. Pennant uppermost.

A. Compass signal.

Q. Two flags. Pennant uppermost. Flag W undermost.

A. Meteorological forecast.

Q. Two flags. Square flag uppermost.

A. Urgent, or Danger signals.

Three Flag Signals.

Q. Three flags.

A. Universal, and express Latitude, Longitude, Time, Numeral, and all ordinary signals, required for communication.

Four Flag Signals.

Q. Four flags. Burgee uppermost.

A. Geographical signal.

Q. Four flags. Pennants C, D, or F uppermost ?

A. National vocabulary and spelling table.

Q. Four flags. Pennant G uppermost ?

A. Name of Man of War.

Q. Four flags. Square flag uppermost ?

A. Name of Merchant Ship.

To Interpret a Signal.

Q. A ship hoists the signal B D, find its meaning ?

A. What ship is that.

Remarks—Find the two flag signals in Part I, and the signals being arranged in alphabetical order, it must be near the beginning of those signals, BC is the first signal, D is the next consonant to C, and opposite to BD is the question "What ship is that?" which is the meaning of the signal.

Q. Find the signal GH ?

A. WNW.

Q. Find the signal DW†—(2) ?

A. Meteorological report for to-morrow gives "Moderate Winds" in direction (indicated by a compass signal.)

Q. Find the signal NC ?

A. In distress ; want assistance.

Q. Find the signal BHJ ?

A. In distress ; want assistance.

Remarks—It sometimes happens that two different signals have the same meaning, as is the case in this and the preceding signal.

Q. Find the signal FPG ?

A. 23° longitude.

Q. Find the signal GTB ?

A 0 Minutes of latitude, longitude, or time.

Q. Find the signal GRP ?

A. 3 hours P.M.

Q. Find the signal WCR ?

A. 41.

Q. Find the signal HCK ?

A. September.

Q. Find the signal HDK ?

A. 6th.

Q. Find the signal VFB ?

A. Franc.

Q. Find the signal WTG ?

A. G.

Q. Find the signal BCJG ?

A. Gulf of Obi.

Q. Find the signal CBPG ?

A. Ed.

Q. Find the signal WVL ?

A. . Finish of word, or dot between initials.

Q. Find the signal CHDK ?

A. Abroad.

Q. Find the signal GQRV ?

A. Challenger, screw.

Q. Find the signal HTRJ ?

A. Rookwood, of Cardiff.

To make a Signal.

Q. What is your latitude brought up to the present moment ?

A. FDJ.

Remarks—The outside of the leaves of the signal book are coloured Red, Blue, and Red again.

The first Red denotes Part I., Blue denotes Part II., and the second Red denotes Parts III. and IV.

Latitude is the principal word in the preceding sentence. L is nearly the middle letter of the alphabet. Open the blue part near its middle, and you will be near the letter L. Look for the head Latitude, and, under it, you will find the question opposite to which is the answer.

If the principal word begin with a letter near the beginning of the alphabet, open the blue part at the beginning. If it begin with a letter near the end, open the blue part near the end.

Generally, to make signals, open Part II., but to make or interpret compass or meteorological signals, look at Part I., page 1. To interpret geographical signals, look at the latter part of Part I.; to make geographical signals, look at the latter part of Part II. Look at the beginning of Part II. for the spelling table. Look at page 75, Part I., for the alphabet ; at page 73 and 74, Part I., for the numeral table ; at pages 60 to 62, Part I., for auxiliary phrases, such as I shall ; Will you ; That I ; and so on. Look at pages 21 to 24, Part I., for latitude and longitude ; and, at pages 27 to 28, Part I., for time.

Q. Attention. Pay attention ?

A. BK.

Q. S½W ?

A. FC.

Q. Meteorological report for to-morrow gives winds variable between W½N and NW by W ?

A. Former part, GW. Latter part GC and GK.

Q. Want immediate assistance ?

A. HB.

Q. You are standing into danger ?

A. JD.

Q. Tack instantly ?

A. JT.

Q. Keep in the centre of the channel ?

A. LH.

Q. Chin-chew ?

A. BLRS.

Q. Do you want a steamer ?

A. KRH.

Q. Is it good holding ground ?

A. KVM

Q. Can damage be repaired at sea ?

A. BGJ.

Q. Have all your anchors and cables ready for use ?

A. LHN.

Q. Muscat ?

A. BKVT.

Q. 48 ?

A. WCT.

Q. 1,757,497 ?

A.

WQR	1,000,000
WQM	700,000
WPT	50,000
WMR	7,000
WHP	400
WHG	97
VTJ	?
	1,757,497 ?

Remarks.—In making this signal, hoist WQR and keep it up till the other ship hoists the answering pennant; then haul WQR down and hoist WQM; and so on.

Always keep a signal up till it is answered.

Q. Spell John Harrison's name?

A.		
	CDJP	Jo
	WTH	h
	WTP	n
	WVL	Finish of word.
	CBWQ	Har
	CFJG	ri
	CFMH	so
	WTP	n
	WVL	Finish of word.

Q. Spell "Can you supply me with a cask of beef?"

A.		
	CBJQ	Can
	WVL	Finish of word.
	CGDR	yo
	WVD	u
	WVL	Finish of word.
	CFMS	su
	WTR	p
	CFDB	ply
	WVL	Finish of word.
	CDPV	me
	WVL	Finish of word.
	CFWJ	wit
	WTH	h
	WVL	Finish of word.
	WST	a
	WVL	Finish of word.
	CBJS	cas
	WTL	k
	WVL	Finish of word.
	CDTW	of
	WVL	Finish of word.
	CBGS	be
	CBPJ	ef
	WVL	Finish of word.

Q. Hirundo, of North Shields, official No., 16778, discharged artillery, 140 tons coals, 60 bags, marked C.N., on board Shannon, Man of War, at West Indies, latitude 18 42′ 16″, longtitude 74° 59′ 22″,

on Monday, 14th August, finished unloading 8 hours P.M., wind N.W., King, Hedley, stowed cargo.

A.	MCVF	Official No., 16778,
	CSJG	discharged
	CDN or NMP	artillery,
	WHL	100
	WCQ	40
	VQB	tons
	KCP	coals,
	WDV	60
	CKPV	bags,
	DJNC	marked
	WTB	C.
	WTP	N.,
	DRC	on board
	GTQW	Shannon, Man of War,
	CKFL	at
	BPND	West Indies,
	FHW	latitude 18°
	GWP	42′
	WBG	16″,
	FSK	longitude 74°
	HBR	59′
	WBN	22″,
	QGT	on
	HCQ	Monday,
	HDT	14th
	HCJ	August,
	QRP	finished
	FCDT	unloading
	GRP	8 hours PM.,
	HRF	wind
	GM	N.W.,
	CKDV	Kin
	WTG	g,
	WVL	finish of word,
	CBWV	He
	CBMR	dl
	CBQT	ey.
	WVL	Finish of word,
	DVPS	stowed
	NJB	cargo.

Remarks—A second mate must understand the adjustments of the sextant as given further on. All candidates must pass the above examination satisfactorily, but candidates for masters' certificates, should, in addition, be able to answer the following questions:—

Q. How can you tell the quadrants of the compass by any particular characteristic in the hoist?

A. From N to E½N the C pennant is uppermost.
,, E ,, E½S ,, D ,, ,,
,, S ,, W½S ,, F ,, ,,
,, W ,, N½W ,, G ,, ,,

Q. What is the meaning of a two-flag signal, pennant uppermost, flag W below?

A. Meteorological forecast.

Q. What flag in the spellling table is common to every syllable?

A. Pennant C uppermost.

Q. How is the commercial code applied in making boat signals?

A. The distance signals are used.

The signals are *made from right to left*, and *read from right to left.*

Q. You have no distant signals?

A. Take handkerchiefs, square pieces of canvass, or deals for square flags. Narrow strips of canvass or other material for pennants; and hats, buckets, or corkfenders for balls.

Q. What means are there for reporting ships passing along the English coast?

A. Ships hoisting their names according to the code will be reported to the *Shipping Gazette.*

Q. How are signal letters for reporting a ship's name to be obtained?

A. By applying to a Registrar of Shipping at one of the Custom Houses; or, the Registrar General of Seamen in London.

Mortar and Rocket Apparatus.

Q. You are stranded. A rocket with line attached is fired over your ship?

A. Get hold of this line and secure it, then make a signal to the shore.

Q. What signal will you make?

A. If in day time, one of the crew, separated from the rest, will wave his hat or hand, or a flag, or handkerchief.

CORRECTIONS.

E ,, S¼E ,, D

Read—The signals are *made from right to left*, and *read from left to right.*

A. Make it fast, about 18 inches above the tail block. Taking care that there are no turns of the whip line round the hawser.

Q. What takes place next?

A. Make the signal to the shore.

Q. What next?

A. The people on shore haul off a cot. When one of the crew is in it repeat the signal.

Q. What must be strictly adhered to?

A. The system of signalling.

Q. Who must be landed first?

A. Women, children, passengers, and helpless persons before the crew.

If the hawser cannot be set up. A life buoy will be hauled off, and the shipwrecked people will be hauled through the surf.

Q. You join a ship either as second, only, or first mate. What are the first things you do?

A. Report myself, ask for orders, if none given take an account of everything that will be under my charge. Examine the ship outside and inside, below and aft, and note the order that everything is in.

ADDITIONAL FOR ONLY MATE.

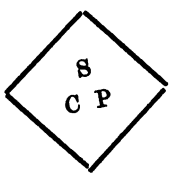
Mate's Duties and Responsibilities, &c.

The mate takes account of the cargo as it comes on board, and as it is discharged. He gives receipts to the persons who bring the cargo to the ship, and takes receipts from those who take it away. In the case of a ship loading a general cargo, particularly a steamer, the mate should note in what hold, and what part of that hold, every merchant's cargo is stowed.

At Cronstadt, printed instructions are given to the ships; in them the mate is instructed to insert, in every receipt he gives, the clause: "This receipt to be null and void when bills of lading are signed."

It is advisable for the mate to insert the above clause, whenever he gives a receipt at any port; otherwise, the captain ought to obtain possession of the mate's receipts before he signs bills of lading. The captain signs bills of lading on the faith of the mate's account; it is therefore of great importance that the account should be correct. In order that this may be the case, the captain should give his mate strict instructions to do nothing else but keep account while taking in cargo, or discharging it. The writer would also strongly impress on the mate the necessity of suffering nothing to distract his attention; his account book should be properly ruled, and he should be careful to take the marks and numbers of the goods, thus:—

Account of casks of tallow received on board the *Neptune*, Oct. 12th, 1866, from lighter No. 275.

Marks.	Numbers.
	4554 4581 4575 4613 4541

By drawing a stroke under every fifth number, the account can be easily referred to, and the number of packages readily ascertained.

A dispute took place about a cask of tallow while taking in the above cargo. The merchant's clerk only kept tally, but the mate took the marks and numbers as well; the authorities therefore decided that the mate's account was correct, which proved to be the case.

If any cargo be damaged, the mate should refuse to take it on board, until he has an opportunity of calling the captain's attention to it. If the marks are defaced on a package, or hoops off, say, a tallow cask, he should note the fact on the receipt he gives to the person bringing the cargo to the ship.

The following legal decisions shew the importance of the mate's duty, and how seriously his conduct may affect his own hard-earned wages.

In a case tried in the Admiralty court, the judge said: "The doctrine I mean to hold is, that the mate having signed the receipt, he is responsible for the correctness of the signature, and that it is a certificate of the fact therein alleged; that he is bound by that signature; and if it should turn out afterwards that there is any deficiency in the" quantity "of cargo which comes to be delivered at the port, unless he can shew to the contrary, I should hold that that deficiency he is responsible for. . . I cannot hesitate in saying for a single moment that it is my duty to pronounce. . . .against the claim made by the mate" on the owner for wages held back by him to the value of the missing goods."

The mate has sometimes been made to pay part of the loss, when the judge has considered him partly, but not wholly, to blame.

On the other hand, neglect, or incompetency, must be clearly proved before the mate can be made to pay. He is not responsible if the captain requires him to attend to other duties while he is taking in cargo; nor if the captain interferes improperly with him; nor for an accident.

The mate must have all purchases and everything connected with taking in cargo in good order, and must note in the cargo book the marks, numbers, and quantities of cargo taken in each day.

He must understand all about anchoring, and we therefore refer him to the Articles on that subject.

Log Book.

Q. What entries do you make in the ship's log book while in harbour?

A. All matters having any reference to cargo, employment of crew, position of ship, and state of the weather.

Q. What entries do you make at sea?

A. All matters having any reference to the ship's position, as soundings, bearings and distances of fixed objects, latitude and longitude, wind and weather, sail, and employment of crew.

Q. You have a perishable cargo; it is bad weather, what must you do?

A. Be careful to pump the ship and note the facts thus:—Ship labouring in a heavy sea, straining severely, shipping a great deal of water. Pumps carefully attended.

Lifting Heavy Weights.

Q. What weight would you lift with a yard arm tackle?

A. Nothing heavier than a small cask of water. If compelled to use such a purchase for a heavy weight; untruss the yard, top it well up, and secure it well with lashings to the mast, rolling tackles, and guys.

Q. Get a heavy weight, as marble, or machinery, on board?

A. Rig a derrick with its feet near the side of the ship and a pair of shears, with their feet placed fore and aft, or from one corner to to another, over the hatchway, on beams, and support them well underneath by shores under the deck beams. Lash the feet to ringbolts or timber heads.

Lift the weight by the derrick purchase, and assist it as much as possible by the shear purchase. When it is high enough, and over the hatchway, lower both purchases.

A. Reeve a purchase in a threefold block?

A. If the block have a rope strop, lead the first part of the fall over, or under the middle sheave. If the block be iron bound, lead the first fall over one of the side sheaves, and so on, in regular order.

Accidents.

A. A man falls overboard?

Heave life-buoys, spare spars, hen coops, or anything that is suitable towards the man to float him.

Round the ship to, and get under her such sail that a boat may be safely lowered. Or it may be necessary to put the ship about, and stand towards the man. Send a hand up aloft to watch the man. Boats should always be as near as possible ready for lowering down, falls clear, oars, tholes, plug, and baler in them, and no more lashings, on them than are necessary for their safety, and no lumber should be allowed to be put into them.

Q. The cargo is heating ?

A. Open hatches, and send a stream of air into the hold with windsails.

Q. A fire breaks out and cannot be got under ?

A. Prevent air from getting to it by putting on all hatches and tarpaulin over them, and stopping all holes and crevices.

Get the boats ready with water and provisions in them.

If practicable, bore holes in the deck above the fire, or in the sides, and let sea water on to it.

Q. Make a raft ?

If the weather be moderate, a raft may be easily made by laying the larger spars, such as topmasts, jib-booms, and main-booms parallel, and at a little distance from each other, and then lashing smaller spars, such as studdingsail booms and studdingsail yards across, then laying deals, bulkheads, &c., for a deck. Empty casks lashed to the larger spars will cause the raft to float better, and thus to bear more weight.

If there be plenty of spars they may be laid on each other in tiers, one tier crossing another until the spars are all expended, all being securely lashed and nailed together. Some posts may be fixed up at the outside of the raft, and a rope hitched to the tops of them to serve as bulwark.

With a stranded vessel on a lee shore, a small raft sufficient to land the crew could be made in a short time, by lashing three small spars in a triangular form, and a water cask or breaker lashed to the middle of each spar, and a netting or lashing worked inside the triangle so as to hold on with ; this would float several people, and not be liable to capsize in broken water.

Q. Your bowsprit is sprung, or carried away ?

A. Get the ship before the wind, reduce sail, take warps for stays, and tackles on them, set them up to the hooks, cat head, or to toggles through the hawse holes. Fish the bowsprit if it be sprung. If it be carried away, take the most suitable spare spar and rig it for a jury bowsprit. Send down the topgallant yards and masts.

Q. Your masts are sprung or carried away ?

A. Generally speaking it is best to get the ship before the wind, if it can be done ; if a mast be sprung, reduce sail and fish the mast, secure it with additional preventer stays and tackles. If it be carried away, clear away the wreck and rig a jury mast with the strongest spare spars on board.

Q. You spring a spar, or carry it away?

A. Ease the particular spar by taking sail off the ship and keeping her before the wind. Fish the spar, or rig jury spars; make warps and tackles fast to them for preventer stays.

Q. Some of your stays, braces, sheets, parral, &c., are broke, or some of your sails split?

A. Ease the particular part affected by lowering, hauling down, or brailing up sail, keeping the ship before the wind, or hauling yards aback and then repair damages.

ADDITIONAL FOR FIRST MATE.

Official Log Book.

Remarks.—A first mate must be able to make the entries in the official log book.

He must insert the ship's draught of water when load, and the clear side from the water's edge to the lowest part of the deck.

Q. What is the official log book, and what is it for?

A. It is a book in a form sanctioned by the Board of Trade. It is to make entries concerning the ship's crew and passengers.

Q. When must the entries be made?

A. As soon as possible after the occurrence to which it relates.

Q. What is the latest time that the entry can be made?

A. Twenty-four hours after the arrival of the ship at her final port of discharge.

Q. How is the entry to be made?

A. The entry should be made by the master, signed by him and the mate, or one of the crew.

Q. What must be done if an entry is made concerning one of the crew?

A. Read the entry over to the man, and, if he makes any reply, enter and sign it also.

Q. If a seaman dies what entry is made concerning him, his wages, and effects?

A. Cause of death, medical treatment, statement of his wages and effects.

Q. What is done with the effects?

A. They may be sold, and a statement of every article, with its price, entered in the official log.

Q. What is done with the money and effects, if any are left unsold?

A. Delivered to the shipping master at the final port of discharge in the United Kingdom.

What is done with the official Log Book at the end of the voyage?

A. It is delivered to the shipping master within 48 hours of her arrival, or when the crew are paid off, whichever happens first.

Q. Give a short statement of the principal entries?

A. Ship's name and official number, Master's name, voyage. List of crew, conduct, offence, conviction, punishment, sickness, medical treatment, and death, of any of the crew. Wages of men entering the navy. Wages and sale of the effects of any man that has died. Births, marriages, collisions, survey, and naval court.

Q. There is a fly leaf of blue paper in your official log book for reporting outward-bound ships when you arrive at home. What is done with it?

A. On arrival at port fill it up and send it to the Registrar-General of Seamen.

ADDITIONAL FOR MASTER ORDINARY.

Ship's Business. At Home Port.

Q. What are the first things you do on being appointed master?

A. Get all the ship's documents from the previous master, and enter a list of them in the official log.

Get my name put on the register.

Q. What is a Charter Party?

A. A written or printed contract between a merchant or his agent, and a shipowner or his master, for the employment of a ship.

Q. Is there any precise form of charter?

A. No. The master usually states the name of the ship, nationality, class, if coppered, registered tons, name of master, and where the ship is.

Q. What covenant does the master make?

A. That the ship is tight, staunch, and strong, and every way fit for the voyage.

Q. What does he allow the merchant?

A. A certain number of days called *lay days* to load and unload the cargo; and, if required, a certain number of days called *demurrage days*, for which he is to be paid extra.

What else does he agree to?

A. That as soon as the ship is load, she shall proceed on her voyage with all convenient speed, and on arrival at her port, or *as near thereto as she can safely get*, he will there deliver his cargo to the merchant or his agent. The perils of the sea and other dangers excepted.

Q. What are those exceptional dangers?

A. The Act of God, the Queen's Enemies, Restraints of Princes, Pirates, Fire, and all and every other Dangers, or Accidents of the Seas, Rivers, Navigation, of what nature and kind soever, during the said voyage, being always excepted.

Q. What does the merchant agree to do?

A. To load the ship with a *full and complete cargo*, to load and unload the ship within her lay days, or to pay demurrage, and to pay a certain sum for the use of the ship.

Q. Is there any penalty for non-fulfilment of the charter by either party. If so, what is it?

A. Yes. It is generally the estimated amount of freight.

Q. Does the charter state the mode of payment?

A. Yes.

Q. What is done with the charter?

A. The original charter must be stamped, and it is left in the hands of the broker, who gives the captain a certified copy of it, which should also be stamped.

Q. What is done with the charter in some foreign countries?

A. It is necessary to employ a sworn broker, who affixes his seal to the charter, otherwise it is not a legal document, and cannot be used in a court of law.

Q. What must be done by the last person that signs the charter ?

A. He must cancel the stamp by writing his name, or the name of his firm, together with the true date of writing the same across the stamp.

Q. Must there be witnesses to the signatures of the parties ?

A. Yes. If both parties sign at the same time one witness is sufficient. If they sign at different times there must be a witness to each signature ?

Q. In the event of a dispute between the parties, what must the broker do ?

A. Produce the original stamped charter in a court of justice, in case the captain's copy is not stamped.

Remarks.—Cargoes are often sold while in the ship. In this case, the merchant transfers the charter and other documents to the purchaser, and the captain must carry out the agreement with the person who has bought the cargo.

"The Stamp Act, 1870," came into operation on the 1st of January, 1871. Except where otherwise provided by special enactment, an unstamped, or insufficiently stamped, instrument may be stamped after execution, on payment of the unpaid duty and a penalty of £10. If an instrument has been executed out of the United Kingdom, it may be stamped within two months after it has been first received in the United Kingdom, without penalty; and the commissioners of the Inland Revenue may remit the penalties at any time within twelve months, on sufficient grounds to justify the exemption.

Instruments executed in the United Kingdom, except in criminal proceedings, are "not to be pleaded or given in evidence, or admitted to be good, useful, or available in law or equity," unless stamped according to the Act.

By section 24, any instrument, the duty upon which is required to be denoted by an adhesive stamp, is not to be deemed duly stamped, unless the person last signing the document cancels the stamp by writing his name, or the name of his firm, together with the true date of signing the same, across the stamp.

In this new Act, a charter party is defined to be—"Any agreement or contract for the charter of any ship or vessel, or any memorandum, letter, or other writing between the captain, master, or owner of any ship or vessel, and any other person, for or relating to the freight, or conveyance of any money, goods, or effects on board of such ship or vessel." If the duty on a charter party be not denoted by a stamp, it must be stamped by an impressed stamp, within seven days after

the first execution, on payment of the duty and a penalty of 4s. 6d., and after the expiration of seven days, but within one month, on payment of a penalty of £10, and cannot in a any other case be stamped. If the charter has been executed out of the United Kingdom, either party thereto may, within ten days after its receipt, and before it has been executed by any person in the United Kingdom, affix an adhesive sixpenny stamp, and if such stamp be cancelled properly, the instrument is to be deemed duly stamped. Any number of copies of a charter party may be made; but if they be signed by the original parties to the conditions, they must be stamped, in accordance with the law, in a given time, or they cannot be produced as evidence in court.

Copies of charter parties attested, or in any manner authenticated, and not bearing the signature of the contractors, may be stamped within fourteen days of attestation, and presented as evidence, if the original was duly stamped. Thus, for example, if a charter party be entered into and completed, copies of the same may be made out by a clerk, compared and witnessed by a second person, and sent to be stamped on payment of the sixpenny duty only per copy, within fourteen days.

An attested copy of any stamped instrument being admissible in court, it is advisable, where large transactions have been entered into, for each party to a charter to possess a properly stamped copy of the agreement. Captains too commonly sign a charter party, and are then furnished with a copy which has neither been certified as attested, nor stamped. These last-mentioned copies of the terms of a charter are useful for keeping a captain informed of the terms of his agreement; but in the event of a lawsuit, the want of a duly stamped charter, independent of that in the possession of the broker, is sometimes a source of trouble and expense.

Terms of Charter.

Remarks.—If a charter be offered for a port with which you are unacquainted, ascertain if the season and winds be favourable, if there be water for the ship, if the port be accessible, what the customs and expenses of the place are, how the goods are loaded, and so on.

When there is a scarcity of employment, the captain must make the best terms he can; but when employment is plentiful, he is in a better position to make terms.

Q. What clause would you have with respect to lien on cargo?

A. Ship to have a lien on the cargo for freight, dead freight, and demurrage.

Q. What clause with respect to bringing the cargo to the ship and taking it away?

A. Cargo to be brought alongside the ship and taken from her side at merchant's risk and expense.

Q. What is the afloat clause?

A. Ship to load and unload where she will lie afloat at all times of tide.

Q. What is the ice clause?

A. In case of ice beginning to form before the ship is load, vessel to be at liberty to proceed with what cargo she may have in.

Q. Suppose you are bound to Amsterdam, and you think that ice will have formed in the canal before you arrive there, or before you have time to discharge there?

A. At a certain date, or before that date, if there be ice in the canal, ship to discharge at Nieudiep, before entering the canal.

Q. Would you allow "Working days" to be inserted in the charter?

A. No. I would insert "Running days," even if I had to allow more of them.

Q. Would you allow the phrases, "Sundays and holidays excepted" or "Weather permitting."

A. I would not.

Q. Would you allow the clause, "Freight to be paid by a good bill."

A. No. I would insert it thus:—"Freight to be paid by a good and approved bill on London."

Q. What is a good and approved bill?

A. "If a merchant's bill would be readily taken in the circle in which he is known, it is a good and approved bill within the meaning of the term."—*Shipping Gazette.*

Q. Would you allow the clause, "Cash at the usual rate of exchange"?

A. No. I would stipulate the exact rate of exchange; or insert the clause thus:—"Cash at the current rate of exchange."

Q. You are chartered for a lump sum?

A. Limit the ship's draught of water.

Q. Would you allow the charterer to sign as agent?

A. Not unless I approved of his principal.

Q. Would you agree that the ship shall load or discharge in turn, or that the charterer's responsibility shall cease when the cargo is shipped, or that he shall not be liable for any delay in loading or discharging?

A. I would not agree to any of these things.

Q. If a charter be offered with the clause: "The captain to sign bills of lading as presented to him by the charterer's agent, at any rate of freight, without prejudice to this charter." What would you do?

A. I would write "Provided the rate of freight in the bill of lading is not less than the rate in the charter party."

Remarks.—In a case which occurred to a ship chartered at Calcutta for London, at about £3 10s. per ton, the bills of lading were presented to the captain for signature at 1s. per ton; he signed those bills of lading, and the consignee refused to pay any more. The owners brought an action against the consignee, which they lost, and had to pay a very large sum for law expenses, besides losing above £3 per ton on the freight.

Q. What is the meaning of the phrase "Without prejudice to this charter?"

A. It means that if the shipper present bills of lading for signature at a less rate than the charter, the consignee is not liable for the difference, but the charterer is liable.

Q. If a charter be offered to a "safe port," on, say the East Coast of England, what would you do?

A. Exclude all ports by name that are objectionable.

Q. Would you agree to sign bills of lading "Without qualification;" or would you allow the clause, "or other lawful merchandise?"

A. I would not.

Q. When an advance of freight is to be paid, when would you make it payable?

A. On signing Bills of Lading; not on the sailing of the ship.

Q. In a charter entered into abroad for a cargo to be discharged in the United Kingdom, what would you stipulate with respect to payment of freight?

A. Freight to be paid on delivery, in cash.

Q. Would you get the name of the party who has to load the cargo written on the charter by the merchant?

A. Yes.

Q. Would you allow address commission?

A. Not if it could be avoided; but if it could not be got clear of, stipulate the exact rate per cent. on the charter.

Q. Would you allow the phrases, "Paying the usual commission," or, "on the usual terms?"

A. No. I would stipulate the exact commission, and the exact terms.

Q. If the clause, "According to the custom of the port," is in your charter, what would you do?

A. Ascertain what the custom of the port really is.

Q. What special clauses would you have for a steamer?

A. Accidents to boilers and machinery excepted.

Liberty to call for coals.

Liberty to tow, or be towed.

Q. Would you sign an open charter?

A. Not if I could help doing so. I would have the cargo named.

Remarks—It is too often the case that an open charter is signed by the captain or owner, with the expectation of loading a cargo for which a good freight is stipulated, instead of which a cargo is supplied by the merchant, for which a bad freight is paid.

Q. What do you do after chartering?

A. Prepare my ship for cargo; dunnage her; proceed to my loading berth; give the merchant written notice that the ship is now ready to load, and that to-morrow will be my first lay day. Copy this notice into the ship's log.

Q. Your lay days will expire the next day, the ship is not load?

A. Give the merchant written notice that to-morrow is my last day, and that afterwards the ship will be on demurrage.

Q. How do you claim demurrage?

A. Daily. And on Saturday for the next day, Sunday.

Remarks.—The author is not aware of any law to claim demurrage in this manner, and does not think it absolutely necessary.

RESPONSIBILITY.

Owners, captains, and mates of ships are considered in law as common carriers. The law holds the shipowner liable for the safe custody of the goods, when properly and legally received on board in good order, and for the delivery to the person producing the bill of lading.

It is therefore necessary that all due precautions be taken to receive cargoes, and stow them in good order, and to deliver them in like good order.

All goods must be received according to the custom of the port where they are loaded, unless specially agreed on to the contrary; and the same custom will regulate the commencement of the responsibility of the captain and owners. In some cases, the responsibility commences when the goods are on board of the ship; in others, when the ship's purchases are on them; in others, when they are laid on a wharf alongside of the ship, and the mate has signed a receipt for them.

Owners are liable for losses by thieves, fire, unjust seizures, and so on, though they themselves are not in fault, unless they have protected themselves, by introducing into their charter and bill of lading exceptions as to those matters.

Bill of Lading.

Q. What is a Bill of Lading?

A. A receipt signed by the master for goods received on board of a ship.

Q. How many are there, and who gets them?

A. Three, four, or six in a *set*. The merchant retains one, sends one to his agent, and gives one to the master. At Cronstadt, and some other places, the master must produce two.

Q. What do they state?

A. Ship's name, shipper's name, master's name, kind and quantity of cargo, where shipped, where to be discharged, that it is in good order, and has to be delivered in the same good order, the perils of the seas excepted; to the merchant's agents, he paying freight, *demurrage and all other conditions* as per charter party.

Q. Must the bill of lading be stamped?

A. In England, every bill of lading of a set requires a sixpenny stamp before being signed, under a penalty of £50. Any more copies may be taken without being stamped.

Q. What should be done before signing bills of lading?

A. Get back the mate's receipts.

Q. Anything else?

A. Qualify my responsibility, and write such words as will shew that I have no other knowledge of the goods than that which is obtained from their outside appearance.

Q. Suppose the cargo consist of iron, coal, &c. ?

A. Write "*Weight unknown.*"

Q. Grain, seed, &c. ?

A. "*Quantity and quality unknown.*"

Q. Bales of hemp, flax, &c. ?

A. "*Contents unknown,*" or "*Weight and contents unknown.*"

Q. A number of pieces in bales of manufactured goods ?

A. "*Number of pieces, and contents unknown.*"

Q. For liquids in casks ?

A. "*Contents unknown,*" and "*Not accountable for leakage or deficiency in casks.*"

Q. For liquids in bottles ?

A. Add: "*Not accountable for breakage.*"

Q. If the number of gallons are expressed in the bill ?

A. Add: "*Number of gallons unknown.*"

Q. For crates of glass, earthenware, or other brittle goods ?

A. "*Contents unknown.*" "*Not accountable for breakage.*"

Q. For iron goods ?

A. "*Not accountable for rust.*"

Q. For goods liable to damage by rats and other vermin; or to deteriorate during the voyage ?

A. *Not liable for damage by rats or other vermin; nor for deterioration.*

And so on, according to the cargo.

Q. If a merchant, from any cause, wish his goods to be unshipped at the port of loading after they have been shipped, what must he do ?

A. He must pay the full freight the ship would have earned had she proceeded to her discharging port with the goods; he must also return the bills of lading to the captain, or, if he fail to do so, he must give the captain a deed of indemnity against all claims for the goods from the holders of the bills of lading.

Q. The ship is nearly load. What should you do ?

A. Have the water, provisions, and stores on board. I and my mates produce our certificates at the shipping office, and sign the crew on the articles to be on board at a certain date, so that the ship may not be detained after she is load.

Q. You are load ?

A. Take all my papers to my broker, who goes with me to the Custom House, pays my charges, and gets my papers, including a Bill of Health, which is taken to the consul of the country I am bound to, and who certifies that it is correct.

At Sea.

Q. What next ?

A. Get a pilot. Proceed to sea with all convenient speed, *wind and weather permitting.*

On getting outside, muster the crew. If any missing, ship substitutes. Send an account of them to my owner, and to the shipping office. Make the scale of provisions accessible to the crew.

Q. What precautions must you take concerning the provisions of the crew ?

A. Have proper weights, scales, and measures to weigh and measure them.

Q. By what route do you proceed on your voyage ?

A. By the customary safe route.

Q. What is the consequence if you deviate from that route ?

A. The underwriters are not liable to pay insurance if the ship be lost.

Q. Will anything justify you for deviating ?

A. Yes. Stress of weather. Damage. Leak. To join convoy. To avoid an enemy, or a pirate. And motives of humanity.

Q. What means would you use for the prevention of scurvy among your crew?

A. 1. Commence serving Lime or Lemon Juice out when salt provisions are first issued.

2. Serve out Preserved Vegetables: as Potatoes, Onions, Greens, Carrots, Turnips, &c.

3. A plentiful supply of good water.

4. Attend to cleanliness and ventilation, more particularly in the quarters of the crew.

5. If in port, give a full supply of vegetables, namely, Potatoes, Onions, Greens, Radishes, and especially Watercresses.

Also Fruits: as Oranges, Limes, &c.

Q. You have to discharge in several ports. In what order will you call at them?

A. In the order named in the charter. If not named, in geographical order.

Q. You fall in with a heavy storm, which damages the ship and drives you into an intermediate port. Ship making a great deal of water, likely to damage cargo?

A. The port authorities would likely be alongside before I was moored. Report to them. Engage men and lighters, or whatever was necessary to pump the ship, or to discharge the cargo, so as to avoid damage if possible.

If necessary, warehouse the cargo in my own name, open bales and dry them, or do whatever was necessary to preserve the cargo.

Q. What next?

A. Report to my consul, note a protest, and call a survey by two competent persons—generally two shipmasters.

Q. What next?

A. Send telegrams to my owner, underwriters and merchants. If the damage were serious, wait their instructions, if there were a prospect of getting them in a reasonable time.

Remarks.—A master of a ship, in an emergency, is justifiable in acting as a sensible man would do in case the property were his own. First, prevent further damage, and then get reports and surveys in order, and send them to your owner.

Q. You receive instructions to act as in your own judgement is best for all parties?

A. I would act as if the ship were my own, and uninsured.

If repairs could be efficiently done at a reasonable cost, I would repair the ship, take in the cargo, and proceed with it.

If they could not be efficiently done, or the cost were unreasonable, I might think it best to engage another ship to take the cargo on, and go to another port for repairs. In this case the full freight would be due to the owners, whatever freight I might pay to the other ship.

If the ship were so much damaged that the repairs would cost more than she would be worth after being repaired, I would sell her as a wreck.

If I could not get another ship to take the cargo on, and it were not a perishable one, I would leave it in the hands of a responsible person, to wait instructions from the merchant.

If it were perishable, I would sell it.

Remarks.—Our English Judges hold that it is the duty of the captain to take the cargo on to its destination; or, if his ship be so much damaged that he cannot do so, then he may tranship it. Nothing but the greatest necessity will justify the sale of the cargo; no recommendation of surveyors, or decree of foreign court will do so; nothing but such a necessity as supersedes all human laws will do it. The captain is agent for all parties, and will be justified in doing what a prudent and sensible man would consider best for all parties.

Q. In case of wreck, what is the duty of the master?

A. To save as much of the wreck, stores, and cargo as possible, and his crew must assist him. He must communicate with his owner and underwriters before selling either wreck or cargo. He must also have surveys and protests in proper order to send to his owner.

Raising Money for Repairs.

Q. Your ship is repaired. How would you get money to pay for the repairs?

A. Draw a bill on my owner. If my owner were not known, and my own credit good, give my own acceptance. In both these cases, especially the last, shew in the bill that the money is necessary for the use of the ship.

Q. You cannot obtain money by bills. You are so situated that you cannot obtain money from your owner?

A. Get money on a *Bottomry Bond.*

Q. What is a bottomry bond?

A. A bond *entered into by the master* giving the ship as security for money advanced to him.

Q. What justifies a master for giving a bottomry bond?

A. When he has no other means of raising money to pay for repairs, or necessaries to enable the ship to continue her voyage.

Q. Can the money so advanced be spent in any other way than for repairs or necessaries for the ship?

A. No, it cannot.

Q. How do you get a bottomry bond?

A. Advertise, and take the lowest tender.

Q. You cannot obtain sufficient money on a bottomry bond?

A. *Hypothecate;* that is, give security on the cargo.

If necessary, sell *part* of the cargo.

Q. What is this called?

A. *Respondentia.*

Q. The ship receives further damage on her passage, and has to put into another port for fresh repairs?

A. The master may enter into another bottomry bond; and on arrival, the last bond must be paid first.

Q. When must the money received on bottomry be paid?

A. Immediately on the arrival of the ship in port.

Q. Is there anything payable before a bottomry bond?

A. Yes. Seamen's wages.

Q. If the ship be lost, what is the consequence to the lender of the money?

A. He loses it, both principal and interest, and therefore demands a higher rate of interest than is usual in the ordinary course of business.

Q. If the ship be within reach of a telegraph station, what must you do before getting a bottomry bond on your ship?

A. Send a telegram to my owner.

MORTGAGE. LLOYD'S AGENT. JETTISON. BARRATRY. GENERAL AVERAGE. PARTICULAR AVERAGE. WARRANTY. INVOICE. MANIFEST. SURVEY. PROTEST. SALVAGE.

Q. What is a *Mortgage*?

A. It is a deed *entered into by an owner* in which he gives the ship as security for money advanced to him.

Q. Can he do what he likes with the money?

A. Yes, he can.

Q. How does he pay it back?

A. According to the terms of the deed.

Q. In case of difficulty, can *Lloyd's Agent* act without your consent?

A. The master alone is agent for all parties concerned; neither Lloyd's agent, nor any other person except his owner or underwriters can supersede him, without he misconducts himself.

But Lloyd's agent being generally an experienced man, it is well for the master to avail himself of his services.

Q. What is *Jettison*?

A. It is a voluntary throwing overboard of any part of the cargo; or the cutting, or casting away, of anything appertaining to the vessel. To render the action warrantable, it should be done in a storm to lighten the ship, or after getting aground, for the purpose of getting the ship off, its object being the preservation of the crew and vessel.

Q. What is *Barratry*.

A. When the master, officers, or crew of the ship cheat or rob the owners or assurers;

When a ship is taken from her proper track with evil intent;

Sailing out of port without paying dues:

These crimes being done without the owner's consent, the offenders are said to be guilty of barratry.

Q. What is *General Average*?

A. When part of the property is sacrificed voluntarily, not accidentally, or money paid, for the purpose of saving the remainder of the property, and by such sacrifice the master succeeds in saving it, the property saved is said to be subject to General Average.

Q. Give some instances of general average?

A. A ship is riding at Odessa Mole Head in a gale, alongside of other ships, the spare sails, towline, and warps are put over for fenders, and destroyed. A ship at anchor is likely to be fouled by another driving, and therefore slips. A ship is likely to capsize in a squall, and therefore cuts away the masts. A ship is likely to founder, and therefore throws part of the cargo overboard. A master is forced to sell part of the cargo for the purpose of repairing the ship and taking the remainder to port. The loss caused by any of these things would be a subject of general average.

Q. Who, or what, pays for the loss by general average?

A. The cargo, the ship at the end of the voyage, and the freight, less wages and expenses, each pay in proportion to their value.

Q. Do the victuals and wages contribute ?

A. They do not.

Q. What is *Particular Average* ?

A. When a portion of the property, either ship or cargo, is damaged or destroyed, but not sacrificed, to save the remainder, the loss comes under the head of Particular Average.

In particular average, each party pays for his own loss. At Lloyd's the amount of damage must amount to three per cent. of the whole, unless it arise from stranding.

Q. What is *Warranty* ?

A. In a policy of insurance, is a condition, either expressed or implied, to meet certain contingencies that may arise during the voyage. Thus a vessel must not deviate ; she must be seaworthy, and all reasonable care must be used to guard against risk.

Q. What is an *Invoice* ?

A. An Invoice is an account of the cargo sent by the merchant to his agent. It contains a description of the goods, and their marks and numbers, if any ; also the cost and charges, such as freight and insurance, upon them.

Q. What is a *Manifest* ?

A. A Manifest is a statement, signed by the master, giving full particulars of the cargo ; where, when, and by whom shipped ; and to where and whom consigned. A list of stores has sometimes to be given, and an account of the names of the crew. The merchant sometimes makes the manifest out. In other cases, the broker makes it out from the master's statement.

What is a *Survey* ?

A. It is an examination of damage to ship or cargo by two or more competent persons. Shipmasters, Engineers, or Merchants according to the damage done to ship, machinery, or cargo. They give a written report on the case, and if repairs have been effected, they should report that such is the case.

Q. What is a *Protest* ?

A. In case of ship or cargo happening any damage, or of the merchant failing to fulfil the charter in any respect, a Protest, or statement, must be made before the British consul abroad, or before a Notary Public at home.

The document must give the particulars of the case, and must protest against any loss that may happen to the ship.

When a ship has a perishable cargo, a protest ought to be noted,—that is, a short statement should be made specifying the ship's name, cargo, where from, and date of sailing, and protesting against any loss to the ship from damage that may have happened.

When the extent of the damage has been ascertained, then the protest must be extended,—that is, full particulars of any bad weather that may have been experienced must be given from the log-book, and the officers must witness to the truth of the statements.

In some foreign countries, it is necessary to note and extend the protest at the same time.

Q. What is *Salvage*?

A. It is money paid for saving ship or cargo when in great danger.

At a Foreign Port.

Q. You are off your port?

A. Hoist my ensign, and jack for a pilot. He will take me into port and give me information about the Port Authorities, who will most likely come on board before, or as soon as, I am in port. Answer any questions they may put to me, and produce any papers they require to see.

Q. What next?

A. Take my articles to my consul. Then engage a respectable broker; he is almost certain to know who is my consignee. Note a protest.

Q. How must you satisfy yourself that the person named by him is your consignee?

A. He must produce the bill of lading signed by me and endorsed by the shipper.

Q. Suppose the bills of lading be specially endorsed, thus:

"To be delivered to A on order from B?"

Or: "To be delivered to A on payment for the goods?"

Or in any other manner.

A. A must in the first case produce B's order before I deliver the goods to him.

In the second case, he must produce proof that he has paid for the goods. Or, whatever may be the special endorsement, he must produce proof that it has been complied with before I deliver the cargo to him. Otherwise my owner would be liable to the shipper for wrong delivery.

Q. What next?

A. Give the consignee written notice when I am ready to discharge. Enter a copy of the notice in the log.

Q. Can the shipper stop delivery of the goods?

A. Yes. If the consignee have failed; or there be good reason for doubting his credit, the shipper can give me notice and I must retain the goods. This is called *Stoppage in Transitu.*

Q. Your cargo is liable to damage, what must you do before breaking bulk; and after discharge, if any damage?

A. Call a survey on the hatches. Call a survey on the dunnage.

Q. On arrival you cannot find your consignee?

A. Advertise for him. In case he does not appear before the lay days are expired, warehouse the cargo, advise the shipper, consult a solicitor.

Q. When do your lay days commence?

A. When the ship is at her discharging berth.

Damage to Cargo.

Q. Your ship, or cargo, has received damage?

A. Extend the protest before a notary public.

Q. The damage is a subject of general average?

A. Get the consignee to sign an *Average Bond* before delivering the cargo to him.

Q. What is an average bond?

A. It is a deed by which all parties agree to pay their proportion of the loss.

Q. What is an *Average Statement?*

A. A paper, generally drawn up by a professional man, shewing the particulars of the loss, the contributing value, and each parties share.

Remarks.—A case was tried before the Court of Queen's Bench. A vessel from New York brought flour in barrels, and turpentine in barrels, as part of her cargo. On arrival at Liverpool, it was found that the flour was tainted by the fumes from the turpentine, and damaged to the amount of nearly £197.

The judge, Lord Campbell, said: "The opinion of the court is . . . . that the owners of the ship took the goods in good order and condition, and undertook to deliver them in good order and condition, the dangers of the seas excepted, they were delivered in bad order and condition, being greatly deteriorated by the turpentine, that does not come within any express or implied exception. . . .The owner of the ship is liable."

In other cases, shipowners have been held liable for damage caused to one portion of the cargo, from gas or vapour from another portion, or when one portion is of such a nature, that when brought in contact with another, it will damage it. Thus: if liquids leak out of casks, and damage other goods, the owner is liable. The casks should be stowed above goods that are not liable to damage from the contents of the casks.

If damage happen to goods on the quay alongside of the ship after receipts are given for them, the owner is liable.

He is liable for goods plundered from the ship.

He is liable for improper stowage, even when the stevedore is employed by the merchant. The captain has control over the stevedore, and ought to exercise a general supervision. Some cases have been decided differently.

If deck cargo be carried without the merchant's knowledge and permission, and it be lost or damaged, the ship is liable.

If through defects in the ship, the voyage be unusually lengthened, and the cargo be damaged, or market lost, in consequence, the ship is liable to pay damages.

The ship is liable for damage by rats, unless the captain can produce evidence that he took every precaution against them; such as smoking his ship, keeping cats and traps on board, and so on. Shipowners have had to pay for bright deals damaged by coal dust; for tallow damaged by sand ballast; for olive oil leaking on marble, and staining it; for packages of tea, coffee, and cheese being gnawed by rats; for cutting timber and deals; for the ship not being properly dunnaged, and the cargo being damaged in consequence; and so on.

The following are two cases of several which have come under the author's notice:—

A ship damaged grain from the Baltic; it was found that the dunnage was two inches lower than was usual in the trade, and the owner had to pay £40 damages.

Another ship damaged thin iron plates; on survey, it was found that the dunnage was above the required height at the keelson, but it was laid flat across the ship, so as to be only about 3 or 4 inches high at the bilges. A claim was made on the ship for £150 damages.

It is hoped that these instances will impress captains and mates with the importance of taking every care of the goods entrusted to them.

It is a general principle, that the ship is liable for all damage that could have been prevented by human care and foresight, but she is not liable for damage caused by the act of God.

The captain is bound to prove that he has taken every precaution; and for this purpose he should superintend the mate in filling the log-book up.

Freight. Demurrage.

Q. What is a *Lien* on the cargo?

A. It is the right to retain the cargo till the Freight be paid.

Q. Has the merchant a right to see the cargo before he pays the freight?

A. He has.

Q. If the freight be payable in cash *on delivery* or *during delivery*, has the owner a lien?

A. He has.

Q. If you are doubtful of the merchant, how should you act?

A. Demand the freight day by day as the cargo is discharged. Or demand a satisfactory guarantee.

Remarks.—The master should use a little tact in a case of this kind. Treat the merchant courteously, but keep drawing on him as the cargo goes out, to send to your owner, or to pay wages and expenses.

In England, if the consignee refuse to pay the freight as the cargo leaves the ship's side. Warehouse the cargo, and at the end of 90 days advertise, and sell it, to pay freight and charges. If it do not bring sufficient money for these purposes, sue the charterer for the difference.

Q. If the freight be payable *after delivery*, or *by bills*, has the owner a lien?

A. He has not.

Q. Has the owner a lien for general average, demurrage, or dead freight?

A. He has for general average, but not for demurrage nor dead freight; unless it be agreed on in the charter and expressed in the bills of lading.

Remarks.—The merchant generally makes the freight note out. The following is the form of a freight note:—

Capt. W. C. Bergen, of the *Neptune*, Cr.

By freight of a cargo of coals, as per charter party, from Newcastle to Cronstadt.

keels.	chals.		£	s	d		£	s	d
25	3	... ...	at 7	17	6	per keel	199	16	7
Gratuity to the captain							1	1	0
							200	17	7

Exchange at 29⅞d. per ruble	S.R.	1618	75
Less	rub.	cop.	
Bill on London, £105	843	51	
Merchant's commission, at 3 per cent. ...	48	16	
Discount for cash			
Postages and Petties	1	48	
		893	15
	S.R.	720	60

St. Petersburg, 20*th Sept.*, 1866.

PAUL BOECKEL.

If the merchant has to find a bill, the captain should ask the consul, or some respectable person, whether the bill be good. If he has to pay cash, the young captain should get some experienced captain to go with him to the bank to buy a bill.

A bill is generally given two or three in a set, one of which being paid, the others become null and void; bnt sometimes only one is given.

The captain should register his bill letters, and send one of the set by the post; he should always post it himself, when he can do so, and he should send the other a few days after.

Or, he may send the second to his wife, or to some confidential friend, to give to his owner.

He should take copies of all bills lest they miscarry.

The following is the form of a bill of exchange, being the copy of a small bill sent to the writer's owner:—

St. Petersburg, the 3/15 Oct., 1866.

£10 Stg.

THOMSON, BONAR, & Co.

On demand, pay this our assignment to the Order of Mr. Edward Wilkie, Ten Pounds Sterling.

Value received of Capt. Bergen, as per advice, from

THOMSON, BONAR, and Co.

To Messrs. J. Thompson, T. Bonar, and Co., London.
No. 6373.

Sometimes the bill is made payable to the order of the captain. When such is the case, before he sends it away, he should endorse it to his owner, by writing his owner's name on the back of it, and signing his own name. Thus :—

Pay the within sum to the order of John Hall, Esq.

WILLIAM THOMPSON.

If the ship be chartered homewards, as soon as she is ready to take in cargo, written notice should be given to the merchant through the consul, and a copy of the letter given to the mate to insert in the log-book.

At Cronstadt, when the ship is loaded, the captain must go to the consul's office, sign bills of lading, and settle with the cashier. The consul then gives him a bill of lading, a bill of health if required, and a note to the English clerk at the custom house, who returns his ship's articles, the captain takes them to the guard ship, where he passes through a few formalities, gets a ticket for a pilot, and is then at liberty to proceed to sea.

Previous to leaving port, the captain should send his owner an abstract of receipts and expenditure on ship's account. He need not be very exact ; in fact, it is often impossible for him to be so, as he has often to pay pilots, steamboats, and other unforeseen items, when he is just on the point of departnre. All that is necessary is to give his owner some idea how his money is expended. Of course, correct and particular accounts will have to be given at the end of the voyage.

The following is the form of an abstract, which may be sent on one side of the master's last letter to his owner.

Sir,—Annexed is an abstract of receipts and disbursements on ship's account while at Cronstadt.

			£	s	d
Received freight		.....	200	17	7
Remittance to owner.....		£105 0 0			
	ruble.	copec.			
Provisions	230	72			
Stower	123	83			
Dunnage.....	14	38			
Port Charges, Brokerage	147	08			
Consul's charges	71	92			
Commission outward.....	48	16			
Steamboat, pilot, small items	72	63			
Exchange at 29⅞d. per ruble ...	708	72	88 4 5		
Cash to crew			5 0 0		
Balance in hand.....			2 13 2		
				200	17 7

Errors and omissions excepted.

Breach of Charter.

Q. The agent of the charter wishes you to cancel the charter?

A. I would not do so without authority from my owner, and also the written consent of the charterer.

Q. What would you do?

A. Lie my lay days, and, if required, the demurrage days also; then protest against the charterer, his agent, and all whom it may concern.

Q. Is the ship then at liberty to recharter to the best advantage?

A. Yes. And if any loss be caused by the non-fullfilment of the original charter, the charterer can be made to pay for such loss.

Q. If a merchant cannot load a cargo, can the ship proceed in ballast to the port she came from, and there demand the full freight?

A. No, she cannot; the master ought to do all he fairly can to diminish the loss the merchant has the misfortune to sustain.

Remarks.—In 1868, a ship was chartered to load wheat or other grain from Montreal. On arrival, the price of wheat had fallen so much in England, that the merchant's agent could not send any from Canada, except at a loss; he therefore kept the ship all her lay days and demurrage days. The agent asked the captain to cancel the charter; but not having authority to do so, he declined. Two days before the demurrage days expired, a letter arrived from the merchant instructing the agent to load the ship. The agent said that he had not time to purchase the

cargo, and failed to load the vessel. When the days expired, the captain protested against the merchant, his agent, and all whom it might concern, served the agent with a copy of the protest under legal advice, and then chartered the ship to the best advantage. The documents were sent to the owner, and he received £60 in part payment; the merchant saying that he would pay the balance, £160, when the ship arrived at home, and the loss was exactly ascertained,—which he did. Another ship recovered nearly £500, for loss on breach of charter, at the same time and place.

In all such cases, it is the best way to consult a respectable solicitor, and be guided by his advice.

Dead Freight.

Q. What is Dead Freight?

A. If the merchant fail to load a full and complete cargo according to charter, he must pay the owner freight for the deficient cargo. The money so paid is called Dead Freight.

Q. Where must the dead freight be claimed?

A. At the port of loading, and if not paid, a protest must be made against the merchant and the amount claimed at the port of discharge.

Remarks.—As an example: A ship was chartered to load a full and complete cargo of timber at Cagliari, and to discharge at Woolwich Dock-yard. There was not sufficient to load the ship. The captain asked the agent if he had any other suitable cargo to fill the vessel. The agent had no other cargo.; neither had he any power to pay the dead freight. The captain protested against him and all whom it might concern, secured the cargo, and proceeded on his voyage. On arrival, before breaking bulk, he requested the consignee to appoint a surveyor to measure the empty space. This was done, and freight was paid for it.

As another instance: A ship was chartered at Lisbon to proceed to two ports on the coast of Portugal, and there load a full and complete cargo of locust beans. The ship proceeded to those ports; but the agent had not sufficient cargo to load the vessel. The captain offered to take any other suitable cargo that could be obtained, but none could be got. The captain then sent telegrams and letters to the merchant at Lisbon, and the merchant ordered him to proceed on his homeward voyage, offering to pay him a certain sum for the loss he had sustained. The captain refused to take that sum; protested against him and all whom it might concern; sent copies to him, and requested him to have some person to survey the empty space before the ship broke bulk at home. When the ship arrived at home, a survey was held, and a guarantee for the amount of dead freight, £108, given to the captain before the ship broke bulk.

We may remark on this case, that when the captain's letters and documents were laid by his owner before the demurrage association in which the ship was entered, the solicitor and other gentlemen belonging to the association were of opinion that the ship would not be able to recover the dead freight, because such dead freight was not endorsed on the bills of lading by the agent. The captain did ask the agent for the dead freight; but the agent only laughed at him, and told him he did not care for either him or the merchant, and he might get the dead freight as he could, and it was only by the influence of the British consul, that the agent was induced to give the captain a letter stating that he had no more cargo for the ship. He said that he had fulfilled his contract with the merchant, and had nothing to do with dead freight, and would not write a word about it.

It certainly would be a necessary and prudent precaution to have the bill of lading endorsed with the facts of such cases, for then the receiver of the cargo could not dispute them; but when, as in the preceding case, the merchant or his agent is obstinate, and refuses to allow the bill of lading to be endorsed, then all that the captain can do is to take legal proceedings, under the advice of his consul, to protect his owner's interest, by signing the bills of lading *under protest*. The protest must be given to the shipper, before the bills of lading are signed, and it would be advisable to send copies to the owner of the ship, and to the consignee of the cargo.

If the shipper refuse to allow the words, "*Under protest*," on the bills of lading, then the captain can draw up bills of lading of his own, sign them, and tender them to the merchant. Or, as a last resource, if he can obtain money to pay his charges, he can sail without signing the bills of lading.

A knowledge of exchange is of great importance to a captain of a ship. As an instance, the writer was told by a captain of a steamer that he drew £500 for the use of his vessel, from the merchant at Galatz. He got the money in French Napoleons; these were equal to a certain number of piastres at Galatz, a different number at Ibrail, another number at Sulina, and different again at Constantinople; so that the captain had some difficulty in squaring up his accounts.

When writing important letters to your owner, do not enclose your letters in an envelope. All letters are stamped by the post office authorities, and such stamp is a proof that the letter has actually gone through the post office; but if envelopes are used, the stamp is only a proof that the envelope has gone through the post; it does not prove that any letter has gone.

Always keep your owners well advised of your proceedings,—when
to sail, wind, weather, state of the ship, quantity and kind of
nge in the crew, or anything else it may be for his interest

When the ship has been on a long voyage, it is probable that the crew will have had a considerable sum of money advanced, on account of their wages; in such a case, it is a duty incumbent on the captain to send an account of the sum each man has had. The writer knows of several cases where, owing to the loss of the ship and all hands, or the death of the captain alone, the owners have had great difficulty to wind up the ship's accounts, and it has been too often the case that the captain's relatives have had to suffer a heavy pecuniary loss, besides having to mourn for the death of their protector.

Returned Home.

Suppose the ship to be bound to London. On arrival at Gravesend, the ship must be hove to until the quarantine officer examines the captain's bill of health, if he has one, and puts a few questions to him; if the answers be satisfactory, a document is given to the captain, and an officer is put on board of the ship.

The captain is then at liberty to go ashore, and to go to London, if he choose to leave the ship in charge of a pilot to dock her, and his keys with the mate.

His first visit must be to his broker, who will report and enter his ship inwards.

The ship's register, charter, bills of lading, quarantine certificate, last light bill, list of stores, spare spars, and dunnage deals, are required.

The broker sends a clerk with him to the custom house, where the captain goes through certain formalities, and answers such questions as may be put to him.

The broker then sees his merchant, who passes an entry for the cargo, and the ship is then ready to discharge.

The broker generally advances cash to the captain, to pay wages and other items, and receives authority from him to draw his freight and send it to his owner; but, if it can be done, the captain ought to send his freight to his owner before leaving port.

The captain ought to deliver his articles, and official log, with the required entries properly made, to the shipping master, and pay his crew's wages as soon as convenient after the ship is reported.

The shipping master then gives him a document called a "BB," which he must produce to the customs officer when the cargo is discharged.

The captain and mate ought to keep a general supervision over the lumpers and weighers of the cargo, and if any dispute take place, it ought to be rectified as soon as possible.

When the cargo is out, the ensign must be hoisted at the peak for the customs officer, who will clear the ship, and will give the captain a jerking note, containing a list of all the dutiable articles left on board. This note must be produced to any customs officer who may require to see it.

If possible, the captain must get the weights or measures of the cargo from the weigher or measurer, and give them to the broker, to enable him to settle freight with the merchant.

The broker ought to pay the dock dues and charges, and get a pass for the captain, who is then at liberty to ballast and sail homewards.

On arrival at home, the captain ought to give the owner a balance sheet of receipts and expenditure during the voyage, specifying every item, with all the vouchers and documents.

The preceding is the routine of a particular voyage, but the main points in every voyage are the same. In general, whenever a ship arrives in any port from a foreign country, the captain is not at liberty to land until he has been examined by the authorities of the place; and after that, a respectable broker, or captain that may happen to be there, will keep him right in any formality he may have to pass through.

Miscellaneous Remarks.

In case any one of the crew misconducts himself while the ship is in port, it is necessary to take him before the consul, or a magistrate; and the judge will inflict such punishment as he may deem proper. The captain is not justified in punishing a man himself, while he is in a port where magistrates will do justice to both parties.

In some ports, it is necessary to give written notice to the merchant when the ship is ready to discharge; but in other ports, the entry of the ship in the custom house fixes the time that the lay days commence; but in all cases it is prudent and courteous to see the merchant, or his agent, as soon as convenient.

A charterer has no power to detain a ship after she is loaded and ready for sea, even if the lay days for loading are unexpired.

If the ship be reported on a Saturday, too late for the merchant to begin discharging in fair time, the merchant would be entitled to count his lay days from the following Monday.

Lay days do not count while a ship is under repairs at a port of call.

Lay days do not count while a ship is waiting for spring tides.

If lay days be not mentioned in the charter or bill of lading, a "reasonable time" should be allowed for the discharge of the cargo. This "reasonable time" to be determined by the custom of the port, or by the decision of arbitrators.

If a ship be ordered to discharge at a wharf, or in a dock without any wharf or dock being mentioned, in a certain port, her days will count from the time she is alongside of any wharf, or in any dock in the port.

If she be ordered to a particular wharf, or a particular dock, her days count from the time she is alongside of such wharf, or in such dock.

Written notice should be given when the ship is ready to load or discharge. These notices should be copied into the log-book, and witnessed by the person who serves them, and also by the captain and mate. If the captain be owner, or part owner, then some of the crew, as the second mate or carpenter, should witness the notice.

A consignee is only bound by the terms of the bill of lading, he is not ordinarily bound to refer to the charter, without the captain takes the precaution to write in the bill of lading: "*All conditions as per charter.*"

The master can refuse to sign bills of lading if they are not in accordance with the charter.

The master has not power to alter a charter entered into by the owner, without his consent.

Charters are partly printed and partly written. If there be any discrepancy between the printed and written matter, the terms of the written matter must be adhered to.

It is the duty of the consignee to watch for the arrival of the ship. The master is not bound to give him notice, although it will be prudent to do so.

If the master, or owner, and any of the crew agree *in writing* to submit any question between them to the decision of the Superintendent of the Shipping Office, then that decision will be binding upon both parties.

If the ship be unseaworthy at the time of insuring her, the underwriters will not be liable if she be lost.

If the ship be chartered *to be at a certain port at a stated time*, and she fail in being there, the shipper can refuse to load her. No excuse, such as delay by perils of the sea, will be admitted.

If the ship be under a warranty to *sail, sail from, depart, not to sail*, &c., on, or before, or after, a certain date, she must literally act according to the terms of the warranty.

Do not take sand ballast if you can avoid it.

Spread iron ballast fore and aft.

A master of a general ship can require any package to be opened that he has reason to suspect contains dangerous goods; such as gunpowder, dynamite, aquafortis, &c.; but the shipper, or his servants, must be present.

On arrival at the port of destination, if the cargo be damaged, the merchant must pay the freight, and sue for the damage.

If the ship deviate from the voyage specified in the articles, the crew can leave her, and can demand their wages up to the time they leave the ship.

Always write in courteous terms to your merchant. Thus:—

LONDON, 2*nd April*, 1869.

MESSRS. SARAMANGA AND CO.

Gentlemen,—The *Neptune*, under my command, and consigned to you, is now ready to discharge. Hoping you will favour me with a good dispatch,

I remain, gentlemen,

Yours very respectfully,

W. C. BERGEN.

The writer has known a ship kept longer than she would have been, owing to the notice being too strictly legal, and not sufficiently courteous.

Some merchants are in the habit of loading and discharging ships as fast as they can, and they are rather offended if notice be given to them in a strictly legal form; they are better satisfied when the captain places confidence in them. Other merchants require everything to be done in legal form. The captain must use a little tact, and act in the manner best adapted to further his owner's interest. Always endeavour to oblige the merchant, if you can do so consistently with your duty to your owner.

SEAMANSHIP FOR MASTER.

Q. Your ship is on her beam ends?

A. If in anchorage: Let go the lee anchor. If not in anchorage: Pay out the lee cable chain unshackled from the anchor. Or, make a span fast to a large spar; take a hawser from the lee bow, and make it fast to the span; heave the spar overboard. When the ship comes head to wind, trim the ballast or cargo.

NOTE.—A ship was once driving across the North Sea, lying to in a gale of wind. The cable chain was unshackled from the anchor, and a quantity payed out, which had the effect of making the ship bow the sea better, and of preventing her driving so fast.

Another ship in a similar case made a rope fast to some coal baskets, which had a good effect.

Q. You spring a great leak?

A. Try to get at it, and stop it either outside or inside. If that cannot be done, fother it; that is, get a sail and fasten chopped oakum, or other suitable matter, slightly to one side of it, make ropes fast to the four corners, and pass the sail under the bottom, over the leak.

Q. If forced to run on shore, at what time of tide would you do so, supposing that you could delay for a few hours?

A. If possible, at the time of high water, or a little after it.

Q. Your ship is stranded, how would you get her off?

A. That would depend on the circumstances the ship was placed in.

It might be sufficient to take an anchor away, take the cargo or ballast out, and at high water get a steamboat to assist.

If her bottom were damaged, it might be necessary to caulk her ceiling, or to platform her.

Or perhaps she might be floated by fastening empty casks, or empty tanks, to her.

Or, if she were sunk, divers might make the hatches tight, then get pumps worked by steam to pump her out.

Q. How do you heave a ship down?

A. The vessel's ballast, provisions, and stores that are not wanted for heaving down, are all taken on shore, and the yards and topgallant masts are sent down. In some cases the yards are not sent down.

Suppose the vessel has to be hove down on her port side: then,

The ship being moored at a little distance from the quay,

Two strong ringbolts, well secured and cleated, having the holes for them bored sloping upwards, are put into the ship's side, below the bends, about 10 feet apart, and so placed that the middle of the space between them is abreast of the foremast. Chain lashings are passed through those ringbolts, and their ends made fast to the outer end of an outrigger lying on the rail, the inner end of which is lashed to the foremast, and the outer end projected over the side about 10 feet.

A large double block is lashed to the foremast, below the cheeks, and another to the end of the outrigger; a good small warp is rove for a fall, and a strain is put on it nearly equal to that on the starboard rigging.

A hard wood broad plank is laid on the waterways, on the port side, abreast of the foremast, and a shore is put on this plank, so that its lower end is just above a beam, and the upper end stands under the cheeks, and is well lashed to the mast, and well secured at the heel, shores being put under the beam.

Two small shores, one at one-third the length of the main shore, the other at two-thirds, are put between the mast and main shore, and a lashing put round the mast and main shore, in the way of those two small shores.

A large threefold block is lashed to the foremast, in the way of the lower part of the cheeks, and a large double block lashed to a place for the purpose on the quay; a good warp is led from a crab winch on shore, through a leading block on the quay, and the first part led through the middle sheave of the upper block, and the fall completely rove.

The mainmast is secured, and purchases fixed to it in the same way; the only difference being that there are two purchases on it leading to two crab winches on the shore. The distance between the leading blocks on the shore must be equal to that between the purchase blocks at the mast head.

The port topsides and decks are examined, lest there be any place that will make water when the ship is hove down.

Two pumps are put down the main hatchway, so that their feet may rest on the port bilge.

The vessel is then ready for heaving down.

Should the vessel make much water when hove down, sawdust placed in a small basket (say, bushel basket,) with a long pole attached to it, and moved about the place where the water is running in, will generally stop it.

When heaving down, keep an equal strain on all the warps; they must not be surged; when it is necessary to fleet them, stopper them, and walk back the winches.

When easing the vessel up, it is necessary, or advisable, to walk back the purchases.

In Cronstadt, a large strong barge, fitted up with crab winches, is used to make the lower block fast to.

In case there be no place or vessel adapted to the purpose of fixing the lower block, then pass a chain under the bottom of some other vessel, and make the lower block fast to it. Or, as the writer has seen at Windau, make fast to a raft of timber loaded with stones and iron.

In order to prevent the ship from capsizing, two warps are taken from the shore, or barge, passed under the ship's bottom, brought up on the offside, and made fast on board the ship. As the vessel is hove down, those warps are gradually eased.

If there be much danger of the ship capsizing when she is being hove down, shears are rigged over the masts, and tackles made fast, so as to lower her down, and also to heave her up again, if necessary.

Sometimes a spar is placed upright, close to the ship's side, in midships, secured to both masts, and the heaving down purchases applied to the upper end of the spar.

A great portion of the force exerted is thus applied in a more advantageous manner, and the ship is easier hove down.

Coming into the English Channel.

Q. You are homeward bound from South of the Line, what precautions would you take before entering the Channel?

A. Sight the Azores, and find the error of the chronometer. Find the deviation for the courses up channel.

Q. It has been thick weather for a few days, so that you have only dead reckoning to depend on?

A. Try to strike soundings on the edge of the bank in the parallel of 49° 20′ N.; run on that parallel and sound frequently. When tolerably satisfied with the position given by soundings, shape a course to the Start.

Q. What soundings have you North of Scilly?

A. Soft bottom, comparatively shoal water.

Q. What soundings in the fair way of the channel?

A. Broken shells, smell yellow stones with black specks, and fine sand.

Q. What soundings towards the French coast?

A. Deep water, coarse stones, red sand.

Q. What must you especially guard against in entering the Channel?

A. Being set on Scilly or to the Northward of it, by the tide setting to the North or N.W. nine hours, and only three hours to the South.

Q. Is the Bishop Rock Light hidden on certain bearings?

A. Yes. Between S.W. by W. and W. by N. ¼ N.

Q. What is the bearing and distance from the Bishop Rock to Ushant?

A. S. ¾ E. 100 miles.

Q. Where are the Seven Stones, Long Ships, Wolf Rock, and Runnel Stone?

A. Near the Land's End.

Q. What is the night mark for Falmouth from the west?

A. Lizard Lights in one, W. by N. till St. Anthony's Light bears N.N.E., then steer to the harbour.

Q. What is the course up channel?

A. E. ½ S. correct magnetic.

Q. You are in an iron ship, you have had no observations for the error of your compass, and are doubtful of it; it is hazy, but you make Ushant or the Lizard at night, can you find the course to steer up channel by your compass?

A. Yes. By bringing the Lights in line.

Q. You are nearly up to the Start, it is still thick weather?

A. Consult my chart, heave to with head off, or on, as may be best, sound often, till the weather clears up, or I speak an outward-bound vessel, or a fishing boat.

Q. How does the tide set in the channel?

A. Towards the French coast.

Q. Which side of the channel would you keep?

A. The English side; because there are fewer dangers, and better harbours than on the French side.

Q. What is the bearing and distance of the Casquets from Portland?

A. S. by W. ½ W., 47 miles.

Q. What peculiarity is there in the Casquet Lights?

A. There are three lights, but when they bear W. by S.; S.S.W. ½ W.; and S.E. by E.; or their opposite points they appear as only two.

Q. You are as high as Dungeness, it comes on thick?

A. Heave to with head off or on as may be required till I get a pilot.

Q. Where would you anchor in the Downs?

A. In 8 fathoms, between abreast of Walmer Castle and Deal Castle.

Q. It is blowing hard, wind S.W., snow showers?

A. Double reef the topsails and mizen, take the bearings of the light ships when I can do so Have everything ready in case of parting, or having to slip. If I part, run through the Gull Stream NE. ½ E., run to Margate Roads.

Q. You are on the East Coast of England, or any other coast with which you are unacquainted?

A. Consult the chart very carefully, and before coming to any difficult part make notes in large handwriting, so that it can be easily read on deck with the aid of a lamp; thus it would not be necessary for me to go off the deck when I was at the difficulty.

Q. What is the leading mark through Hollesley Bay?

A. Orfordness Lights in one.

Q. What is the leading mark between Aldbro' Napes and Sizewell Bank?

A. Orfordness Lights in one.

Q. What is the clearing mark for Whitby Scar Rock?

A. Whitby South Light open to the Eastward of the North Light.

Q. What Light is shown at Hartlepool Heugh Lighthouse from half flood to half ebb?

A. A red light below the white light.

Q. What light is shewn from Souter Point Lighthouse below the revolving light?

A. A white light in the line of Mill Rock and Cape Carr Point. A red light in that of Whitburn Steel, Hendon Rock, and White Stones.

Example of an Average Statement.

The following example is from Abbott on Shipping :—

Suppose the following case. A ship was riding in the Downs and slipped from her anchor, she struck on the Goodwin, and the captain was compelled to cut away the mast and cast overboard part of the cargo. In doing these things, another part was damaged, the ship got off the sand, and took refuge in Ramsgate.

Amount of Losses.	£	s	d	*Value of articles to contribute.*	£	s	d
Goods of A. cast overboard,	500	0	0	Goods of A. cast overboard...	500	0	0
Damage of B.'s goods by the jettison	200	0	0	Sound value of the goods of B., deducting freight and charges	1000	0	0
Freight of goods cast overboard	100	0	0	Goods of C.	500	0	0
Price of new cable, anchor, and mast.....£300	200	0	0	Do. of D.	2000	0	0
Deduct one-third 100				Do. of E.	5000	0	0
Expense bringing ship off the sands	50	0	0	Value of ship	2000	0	0
Pilotage, port duties, going in and out of the harbour, and commission to the agent who made the disbursements	100	0	0	Clear freight, deduct wages, victuals, &c.	800	0	0
Expenses there	25	0	0				
Adjusting the average	4	0	0				
Portage	1	0	0				
Total of losses .....£	1180	0	0	Total of contributory values£	11800	0	0

£	£	£	£
Then 11800	: 1180	: : 100	: 10

that is, each person will lose 10 per cent.

Therefore, A.'s loss is	50 00	D.'s loss is	200 00
B.'s	100 00	E.'s	500 00
C.'s	50 00	The owner's,	280 00
	200 00		980 00
			200 00
		The sum of all the losses,	1180 00

Upon this calculation, the owners are to lose £280; but they are to receive from the contribution £380 to make good their disbursements, and £100 more for the freight of goods thrown overboard, or £480 minus £280.

They, therefore, are actually to receive	£200 0 0
A. is to contribute £50, but has lost £500, therefore is to receive	450 0 0
B. is to contribute £100, but has lost £200, therefore B. is to receive	100 0 0
Total to be received,	750 0 0

C., D., and E. have lost nothing, and are to pay as above, viz.:

C.	50 0 0
D.	200 0 0
E.	500 0 0
Total to be paid,	£750 0 0

which is exactly equal to the total to be received; and must be paid by, and to, each person, in rateable proportion, to be ascertained by another calculation, which it is unnecessary to state here.

NOTE.—The following pages are printed partly from stereotype plates of the third edition of Bergen's Epitome of Navigation and partly from stereotype plates of the fourth edition, now in preparation.

Should another edition of this work be required, the following subjects will be incorporated with it:—

DISTANT SIGNALS.

A Code of Distant Signals has been introduced into the Commercial Code Signal Book, to communicate at sea when distance or haze prevent the Signal Flags being made out.

The *characteristic* of the Distant Signal is the *Ball*—one Ball at least appearing in every Hoist of the Distant Code. With respect to the two other Symbols, they may be Pennants or Flags of any Colour, that is to say, any of the Code Pennants or Code Flags may be employed irrespective of their Colour. It will be seen from the Plate of Distant Signals that the Code has been so arranged as to give the least possible trouble in finding the combination required; thus—

The *First* Column contains all the combinations having the *Ball* or *Balls first* or *uppermost* in the Hoist.

The *Second* Column contains all the combinations having the *Ball* or *Balls second* or *separated* in the Hoist.

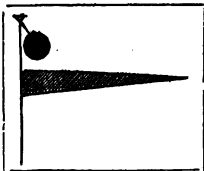
The *Third* Column contains all the combinations having the *Ball* or *Balls last* or *lowermost* in the Hoist.

These Signals are only used when distance or haze prevents the distinguishing of the *Colours* of the Flags.

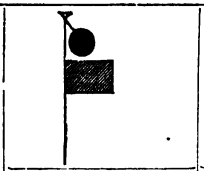
SIGNIFICATIONS of the DISTANT SIGNALS when made *singly*, which will be indicated by the "*stop*" following each Hoist.

B. Asks Name of Ship or Signal Station in sight.
C. Yes.
D. No.
F. Repeat Signal, or hoist it in a more conspicuous place.
G. Cannot distinguish your Flags. Come nearer, or make Distant Signals.
H. You may communicate by the Semaphore, if you please.
J. Stop, or bring to. Something important to communicate.
K. Have you any Telegrams or Despatches for me?
L. Want a Pilot. Can I have one?
M. Want a tug. Can I have one?
N. What is the Meteorological Weather Forecast?
P. Calls attention of Signal Station in sight.
Q. Vessel asks for orders by Telegraph from Owner, Mr.—— at——.
(See QN, Part I, *and Instruction, thereto.)*
R. Report me by Telegraph to my Owner, Mr.—— at——.
(See QN, Part I, *and Instructions thereto.)*
S. Send the following message by Telegraph.
T. Send the following message by the *Signal Letters*, through the Telegraph.
V. ——————.
W. ——————.

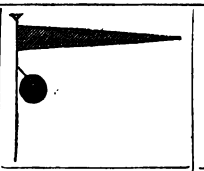
In addition to the above, the following Distant Signals composed of *Two Symbols* have the special signification indicated beneath.



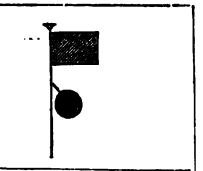
You are running into Danger.



Fire: or Leak. Want immediate assistance.



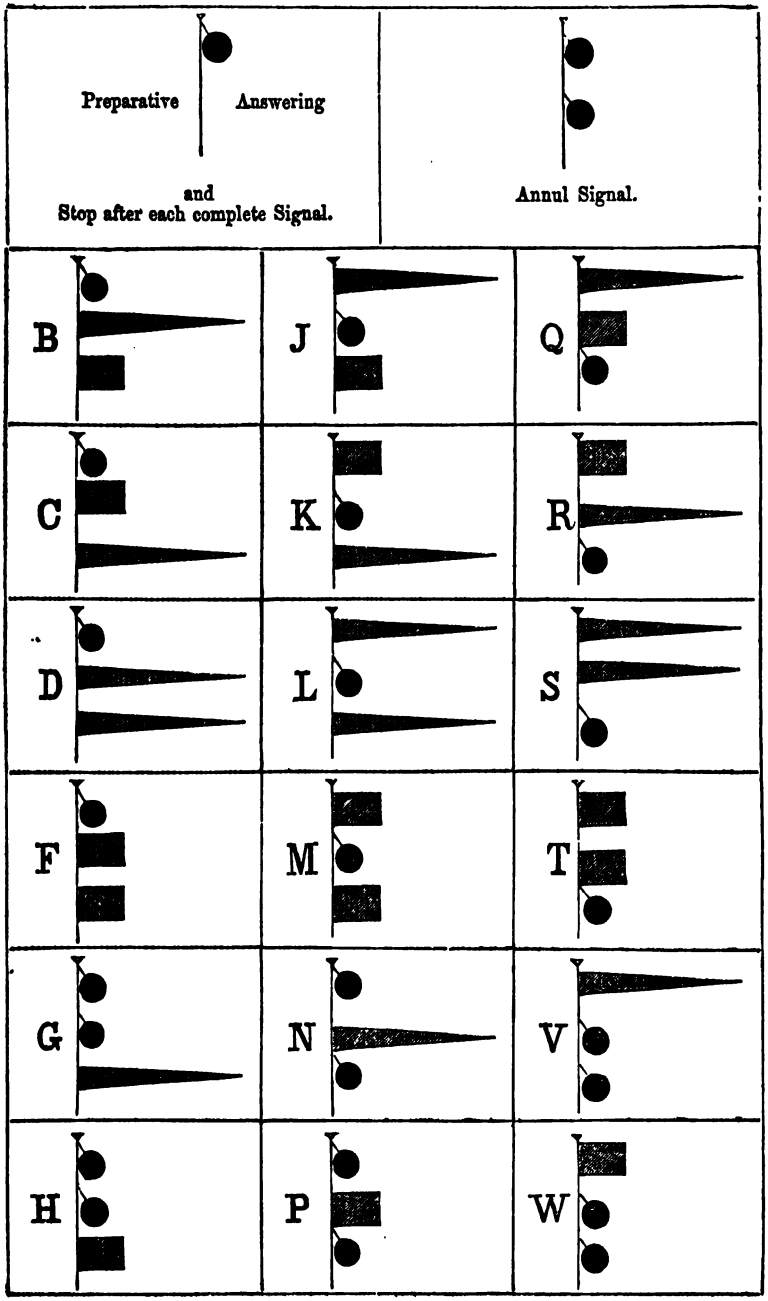
Short of Provisions. Starving.



Aground. Want immediate assistance.

GENERAL ALPHABETICAL TABLE

FOR COMPOSING DISTANT SIGNALS.



SEMAPHORES.

The Semaphores, or Signal Stations, established on the coasts of France, have, wherever practicable, the means of intercommunication by Electro-Telegraphic Wires with each other, and with the chief Metropolitan, Provincial, and Foreign Telegraph Stations.

By the method hereafter described, passing vessels will be able to exchange communication with these Semaphores, and their messages will be received, and, if required, forwarded to their destination, according to the established Tariff of Rates.

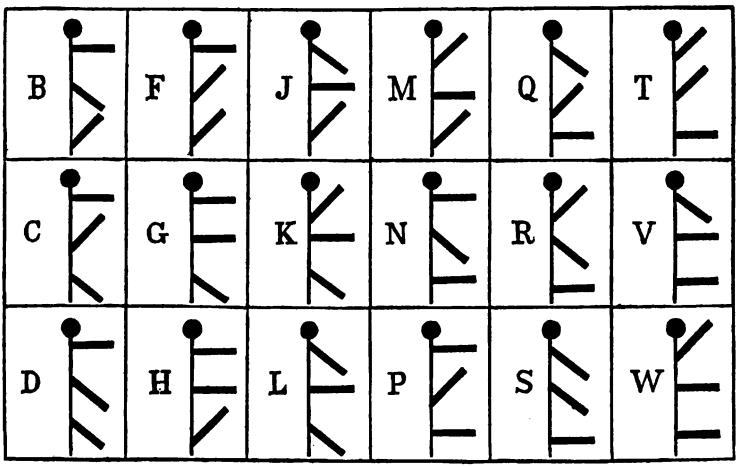
Although at present there are no similar facilities of communication placed at the service of Shipping frequenting the coasts of the United Kingdom, it is believed that should Signal Stations be hereafter established, the French system affords the simplest means of signalling by Semaphore between the shore and ships in the offing at a distance whence the Colours of Flags would not be distinguishable.

At a moderate distance the Signal Flags of the Code can of course be used by both ships and Signal Stations, but the *Distant Signals* should on all occasions be employed by ships when it is found that the Code Flags cannot be made out.

The Semaphores are furnished with *Three Arms*. When at rest the arms are not visible. When at work the position of the arms in the three directions indicated in the Plate (page 352), represents respectively the Three Symbols used in the Distant Signal Code.

The Semaphore Signals will, consequently be always read off as Distant Signals, the position or direction of the arms indicating respectively the *Pennant*, the *Ball*, or the *Flag*.

ALPHABET FOR SEMAPHORE SIGNALS.



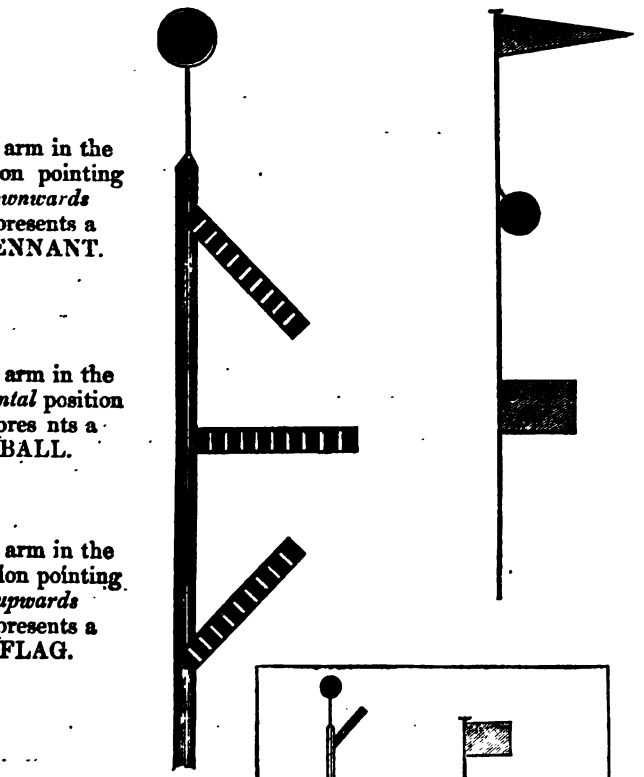
Adaptation of the French Semaphoric System to the Commercial Code for making Distant Signals.

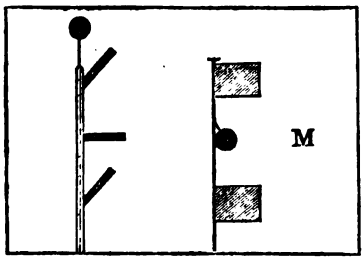
N.B.—The Disc at top of the mast remains in the position indicated below whilst Signals are being made by this Code.

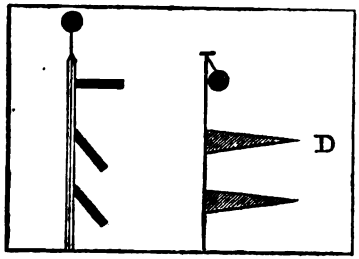
The arm in the position pointing *downwards* represents a PENNANT.

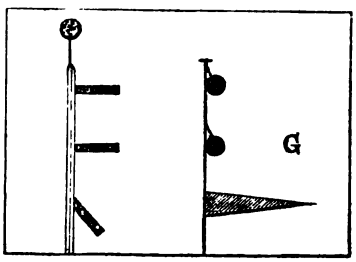
The arm in the *horizontal* position repres nts a BALL.

The arm in the position pointing *upwards* represents a FLAG.









Examples.—MDG. "Leave the Buoy or Beacon to port."

BOAT SIGNALS.

The Symbols to be employed are—

1. Two square flags or pieces of cloth.
2. Two whefts or strips of cloth.
3. Two balls, bundles, or hats.

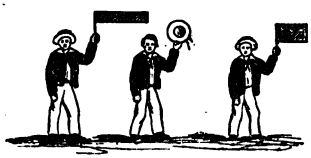
} Of any colour.

By means of the above Symbols, all the Signals of the *Distant Signal Code* may be made as shown below. Handkerchiefs, Hats, Buckets, or Baskets may be used in making these Signals; and if no mast, pole, or spar is handy, these Signals can be made by holding the hat, bundle, or other symbol at arm's length. The Signals will be *made* from *right to left*, and be read off from *left to right*.

EXAMPLES.

or

Signifies: "You are running into danger."

1°.  or J

2°. or B

Signify: JB "Accident; want surgeon."

3°. or

"Stop" or Finish after each complete Signal.

NOTE 1.—It is necessary, however, in using the proper means to attract attention, to avoid those which may occasion confusion.

NOTE 2.—The rule for making Boat Signals will, perhaps, be better understood as follows:—

Boat Signals are made by the first man stretching his left arm out, the second man to stand at the left hand of the first, and so on in order. The Signals are to be read in the same order as a person would read his own name.

Extracts from the Merchant Shipping Act, 1873.

Candidates will be questioned on the following subjects.

"The record of the draught of water of any sea-going ship required under section five of the Merchant Shipping Act, 1871, shall, in addition, to the particulars thereby required, specify the extent of her clear side in feet and inches.

"The term 'clear side' means the height from the water to the upper side of the plank of the deck from which the depth of hold as stated in the register is measured, and the measurement of the clear side is to be taken at the lowest part of the side.

"Every master of a sea-going ship shall, upon the request of any person appointed to record the ship's draught of water, permit such person to enter the ship and to make such inspections and take such measurements as may be requisite for the purpose of such record, and any Master who fails so to do, or impedes or suffers any one under his control to impede any person so appointed in the execution of his duty, shall for each offence incur a penalty not exceeding £5.

"*Signals of Distress.*

"*In the Daytime.*—The following signals, numbered 1, 2, and 3, when used or displayed together or separately, shall be deemed to be signals of distress in the daytime:—

"1. A gun fired at intervals of about a minute;

"2. The *International Code* signal of distress indicated by N C;

"3. The distant signal, consisting of a square flag having either above or below it a ball, or anything resembling a ball.

"*At Night.*—The following signals, numbered 1, 2, and 3, when used or displayed together or separately, shall be deemed to be signals of distress at night:—

"1. A gun fired at intervals of about a minute;

"2. Flames on the ship (as from a burning tar barrel, oil barrel, &c.);

"3. Rockets or shells, of any colour or description, fired one at a time at short intervals.

"*Signals to be made by Ships wanting a Pilot.*

"*In the Daytime.*—The following signals, numbered 1 and 2, when used or displayed together or separately, shall be deemed to be signals for a Pilot in the daytime, viz.:—

"1. To be hoisted at the fore, the Jack or other national colour usually worn by Merchant ships, having round it a white border, one fifth of the breadth of the flag; or,

"2. The *International Code* pilotage signal indicated by P T.

"*At Night.*—The following signals, numbered 1 and 2, when used or displayed together or separately, shall be deemed to be signals for a Pilot at night, viz.:—

"1. The pyrotechnic light, commonly known as a blue light, every fifteen minutes; or,

"2. A bright white light, flashed or shown at short or frequent intervals just above the bulwarks, for about a minute at a time."

228.—THE LAWS OF STORMS.

Cyclones are great storms which obey certain rules called the *Laws of Storms.*

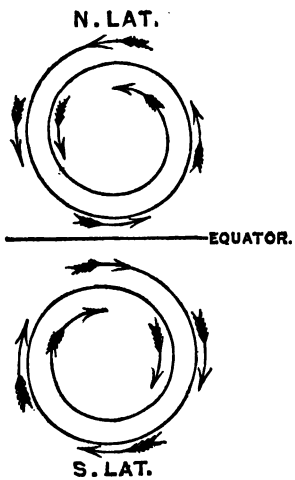
These laws can hardly be said to be fully established, there being certain difficulties connected with them which are not yet cleared up.

FIRST LAW.

The wind in a cyclone revolves round a centre, and describes a curve of a spiral, or circular, form; and the velocity of the wind increases as the centre is approached, until very near it, where there is a space subject to calms, and sudden and violent squalls.

The direction of revolution is against the hands of a watch in North latitude, but with them in South latitude.

An excellent teacher of Navigation gave the writer the following as "the simplest rule for remembering the direction in which a cyclone revolves, is to recollect, that the wind always blows from the West on the side of the cyclone nearest to the equator, whether the latitude be North or South."—See the annexed figure, where the arrows fly in the direction of the wind.



SECOND LAW.

The cyclone has a progressive motion.

An idea of this twofold motion may be obtained by observing a coach wheel, which revolves on its axletree as it rolls along the ground; but there is this important difference, that the part of the wheel farthest from the axletree has the greatest velocity, while the contrary is the case with the cyclone.

To find the bearing of the centre of a cyclone.

Turn your back to the wind; then,

In the Northern hemisphere, the centre of the cyclone will be to your left

hand; but in the Southern, the centre will be to your right hand. In both cases, at right angles to the direction of the wind.

To find the path of the centre of a cyclone.

The following instance will illustrate this problem:— The writer was in command of a ship about 100 miles from the coast of Portugal, bound to Falmouth. The wind was light from the south, but it gradually increased to a gale, and sail was reduced accordingly. The wind still increased until it became a furious storm, still from the south; it then flew suddenly from the N.W. and took the ship aback, and in a few minutes did both vessel and cargo a considerable amount of damage. The writer did not, at that time, understand the laws of storms; but on thinking the matter over afterwards, he perceived that the damage might have been avoided by acting according to these laws; thus,

The wind being from the south, then by the first law the centre bore west; and the wind increasing, the same law showed that the centre was coming nearer the ship. Hence the path of the ship being North, that of the storm would be somewhere between North and East; thus the two paths would cross each other and the centre would pass over, or near, the ship, and place her in great peril, which was the case.

Had the ship been hove to, with her head to the E.S.E., she would have drifted from the centre, and would have come up and bowed the sea, instead of being taken aback, and falling into the trough of it, when the wind flew from the N.W.

Take the following as another example:—Suppose a ship in North latitude be moving slowly, and the wind blowing furiously from the S.W.; then the centre will bear N.W.

If now the wind change to W.; then the centre will bear N.

If the strength of the wind do not change, it may be assumed that the centre is at the same distance from the ship at both observations. Place a parallel ruler over the extremities of the N.W. and N. points of a compass; then the edge of the ruler shows that the path of the cyclone is to the E.N.E.

If the strength of the wind decrease, it may be assumed that the centre is further from the ship at the second observation, and thus the path of the cyclone is to the N. of E.N.E.

In like manner, if the strength of the wind increase, it may be assumed that the path is to the E. of E.N.E.

If the ship be moving rapidly, then her course and distance must be taken into consideration.

Perhaps the best rules that can be given to meet this case are as follows:—

If the velocity of the wind and height of the barometer remain the same, the path of the cyclone is *probably* parallel to that of the ship.

If the velocity increase and the height diminish, the paths of the cyclone and ship will *probably* cross each other.

If the velocity decrease and the height increase, the paths will *probably* diverge from each other.

In South latitude, with the wind in the same directions, the path of the cyclone will be to the W.S.W.

If the learner practise these rules, and draw rough diagrams on the rail or deck, with a piece of chalk, he will soon be able to find the path of a cyclone, and thence will be able to act in the best manner for the safety of the ship, either by running from the centre, or by laying his ship to, on the tack on which the wind when it changes will draw aft, so that the vessel will not be taken aback, and will bow the sea.

Indications of an Approaching Cyclone.

Within the tropics, the height of the barometer is nearly constant; but previous to a cyclone, it falls slowly, and continues gradually falling after the storm has commenced; as the centre is approached, the fall becomes much more rapid, and is lowest at the centre; when it begins to rise, the centre is past.

Dense banks of dark clouds, and what sailors expressively call *dirty* weather, accompany and sometimes precede cyclones.

The waves often go farther than the wind, and sometimes give warning of the approach, or vicinity, of cyclones or gales.

As instances, the writer once experienced a very heavy sea from the eastward, several hours before the gale reached him. A friend of his, Capt. English, stood off Cape St. Vincent, with a light wind from the N.W., but a very heavy sea; while the writer was in the furious storm, about 200 miles farther north, which he has referred to as an illustration. A great deal of damage was done to several vessels crossing the Atlantic by the same storm.

Dimensions of Cyclones.

Within the tropics, the diameters of cyclones vary from 50 to 500 miles; as the cyclone proceeds towards the pole, it increases in diameter, and diminishes in strength.

Paths of Cyclones.

The West Indian cyclones commence about from 10° N. to 20° N. and 50° W.; they pass over the West India Islands in a N.N.W. direction; as they approach the American coast, they often turn to the N.W., N., and N.E. They move at the rate of from 10 to 40 miles an hour.

In the Indian Ocean, they commence in about 10° S. and 100° E., and move at the rate of about 200 miles a day, towards the Mauritius, whence they often turn to the S., S.E., and E.S.E.

In the China Sea, the cyclones move from between N.E. and S.S.E.

Time of the Occurrence of Cyclones.

In the West Indies, cyclones occur from June to October; the worst months are August and September.

In the China Sea, they occur from June to November, the worst month being September.

In the Indian Ocean, they occur from September to May. February and March are the worst months.

In the South Pacific, December and February are the worst months.

For further information on this important subject, the reader is referred to the writings of Reid, Piddington, Thom, and Redfield.

ANCHORING.

BRINGING THE SHIP TO AN ANCHOR.

Q.—Bring your ship up.

A.—Heave the windlass square palls down, put the Normans and riding chocks in their place, overhaul a range, get sufficient chain on deck, cockbill the anchor. If the wind were against the tide or athwart it, stem the tide, pick out a good berth, take a cast of the lead, stow all the square sails I could do without, let the ship have a little, either head or stern, way over the ground, so as to carry the chain as it fall clear of the anchor, stream the buoy and let go the anchor, being careful to sheer clear of it. If the wind were with the tide, stow all the square sails, take plenty of room clear of other ships, haul down the head sails, haul out the mizen, round the ship to and let go the anchor.

Q.—How much range would you overhaul?

A.—Just sufficient to let the crown of the anchor touch the ground.

Q.—You are brought up, it is stormy.

A.—Take a cast of the lead, take cross bearings of some remarkable objects, double reef the topsails and mizen, point the yards to the wind, get the second anchor ready, and see that the shackles could easily be knocked out of the cable chain in case I had to slip.

Q.—It is a gale of wind, night time, you are on a lee shore and cannot keep off, there is a harbour to leeward where you have never been, but there are no pilots?

A—Examine the chart very carefully, note the bearing of the light while running in, and also from the anchorage and the depth of water, also the wind and time of tide. Make memorandums of these things in large handwriting, so that they could be read on deck with the aid of a lamp. Then get the anchor and chain ready, and make every preparation so far as could be done in a heavy sea, and then keep the ship away from the harbour.

Q.—It is a bar harbour?

A.—Set as much sail forward as the crew could manage—say jib and staysail, sheets flat aft, whole foresail, double or single-reefed foretopsail, close-reefed maintopsail, main yard square, main braces fast, two good hands at the helm, one at the lead, all the rest of the crew at the fore braces, and myself high enough to have a clear view a-head.

Q.—You are over the bar, what next?

A.—Clew up, and haul down sail as snug as possible, and if there were time, stow it, when at the anchorage round the ship to and stop her way, then let go the anchor.

Q. You want to let go an anchor in a heavy sea?

A.—Let go both stopper and shank painter at the same time.

RIDING AT SINGLE ANCHOR.

Explanation of the Nautical Terms used.

Suppose the ship to be riding *head on* to the tide. THEN,

If the wind be *ahead*, or *before the beam*, the ship is said to be RIDING LEEWARD TIDE. Figures 1, 2, 3.

If the wind be *aft*, or *on the quarter*, she is said to be RIDING WEATHER TIDE. Figures 7, 8, 9, 10, 11, 12.

If the wind be *abeam*, she is said to be RIDING WIND ATHWART THE TIDE. Figures 13, 14.

If she be swung by the force of the *tide*, she is said to be TIDE RODE.

If she be swung by the force of the *wind*, she is said to be WIND RODE.

When the tide is done and the ship begins to cant, she is said to TEND to WINDWARD, or TO LEEWARD, as the case may be.

It will be convenient to call the bow and quarter nearest to the anchor the *in-bow* and *in-quarter*, and those farthest from it, the *off-bow* and *off-quarter*.

Two Rules which include all others when a Ship is Riding at Single Anchor.

Q.—What are the two rules which include all others when a ship is riding at single anchor?

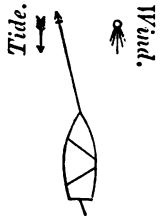
A.—The first rule is: *Always keep a taut cable* so as to keep the ship from her anchor, and to slue the anchor in the ground when the ship moves about or swings.

The second rule is: *Keep no more strain on the cable* than is necessary for the purposes of the first rule.

Remarks.—If the learner go carefully over the following questions and answers, and observe the figures, he will perceive that they include every case that can occur while riding at single anchor, and are all applications of the two preceding rules; so that if he thoroughly understand these two rules, he will always know how to act with his ship.

In the following figures, the direction from the board to the point of an arrow denotes the *set* of the tide. When there is no arrow, it denotes that it is high or low water *slack*. The direction of the wind is shown by the brushes.

FIGURE 1.

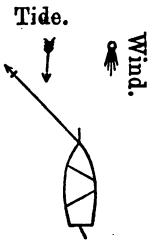


RIDING LEEWARD TIDE.

Q.—If your ship were riding leeward tide *wind ahead*, what would you do during the strength of the tide?

A. If the tide were very strong, I would ride with a long scope of chain out, and place a man at the helm to steer the ship if it were necessary, and keep the anchor right ahead. If it were stormy, point the yards to the wind different ways. If the tide and wind were of moderate strength, give the ship a slight sheer the way I wanted her to swing.

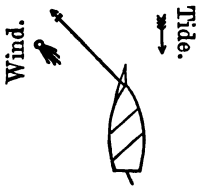
FIGURE 2.



Q. What would you do when the tide eased?

A. Shorten in chain, and give the ship a broad sheer.

FIGURE 3.



Q. If she were riding with the wind before the beam?

A. Give her a slight sheer to leeward during the strength of the tide. WHEN THE TIDE EASED. *If it were moderate.* Haul all the yards aback, hoist the foretopmast staysail, sheet to windward, and give her a broad sheer. *If it were stormy.* Point the yards to the wind and keep the staysail down during the whole of the tide.

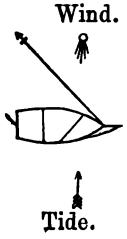
SHIP TENDING TO WINDWARD.

Remarks.—In general, when the tide begins to change, it eases the chain so that it falls to the bottom and drags over it, which prevents the bow moving so fast as the stern, and thus the ship cants.

Q. If you wanted the ship to cant in any particular way?

A. Haul out the mizen, or some other suitable sail, or run a kedge away from aft.

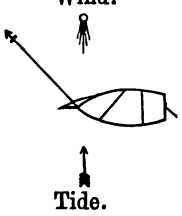
FIGURE 4.



Q. The ship tending to windward?

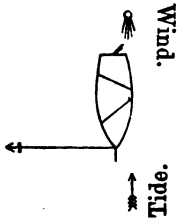
A. *If she canted with her head from her anchor.* Fill the fore yard, haul the main yard by, hoist the foretopmast staysail, lee sheet aft, and put the helm hard over to sheer her from her anchor.

FIGURE 5.



If she canted with her head towards her anchor. Haul the fore yard aback, main yard by, weather staysail sheet up, and sheer her from her anchor. When the ship cants this way the chain does not chafe the copper.

FIGURE 6.

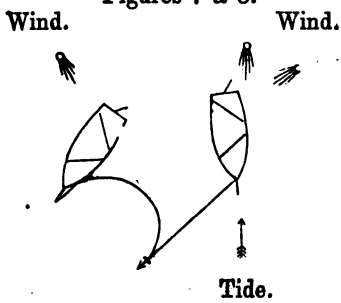


Q. The ship has just swung to the weather tide?

A. Haul the staysail down as soon as it begins to shake, while the tide is easy sheer the ship from her anchor, fill the main yard—that is, in this case, so that the lee yard arm would be above the in-quarter, haul the fore yard by; when the tide comes away strong, ease the helm.

RIDING WEATHER TIDE.

Figures 7 & 8.



Q. You are riding weather tide, the tide stronger than the wind?

A. Keep the main yard full, fore yard by; if the ship were steered by a tiller, keep it pointed *to the anchor*; if not, keep helm pointed *from the anchor*.

Q. Where would the anchor be?

A. On the lee bow.

Q. How long would the ship ride in that position?

A. As long as the tide was steady on the *in bow*, and the wind kept on the *off quarter*, or *aft*. If the tide were not steady, or the wind veered on the *in quarter*, so as to force the stern from the anchor, the tide would catch the *off bow*, ease the strain on the chain, and likely cause the ship to break her sheer.

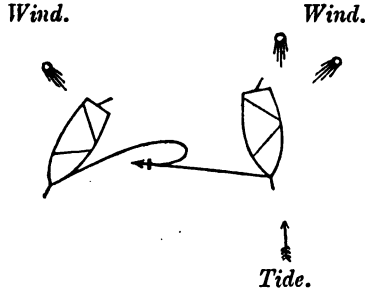
Q. If she broke her sheer, would she foul her anchor?

A. No.

Q.—How would you act?

A.—I would hoist foretopmast staysail, lee sheet aft; stand by to change the helm and haul the yards round as soon as the ship was head on to the tide again, and then lay her at the other side of her anchor. If she would not lie steady, I would steer her.

FIGURES 9 & 10.



Q.—You are riding weather tide, the tide eases, or the wind increases, so that the wind becomes as strong as the tide, where would the anchor be?

A.—On the lee beam.

Q.—What would you do in this case?

A.—Fill the yards, and set whatever sail was necessary to force the ship ahead of her anchor.

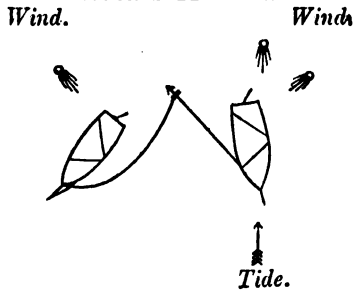
Q.—Why would you do this?

A.—Because if the ship were to break her sheer with the anchor abeam, she would be in great danger of fouling it.

Q.—What would you do in such a case?

A.—If I had any reason to suppose that she had fouled her anchor, I would pick it up. If she had not done so, I would set her ahead at the other side of her anchor.

FIGURES 11 & 12.



Q.—Where would the anchor be?

A.—On the lee quarter.

Q.—If the ship broke her sheer, would she foul her anchor?

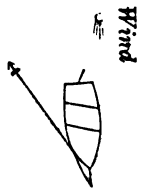
A.—No.

Q.—What would you do?

A.—Hoist foretopmast staysail, lee sheet aft; stand by to change the helm, and haul the yards round as soon as the ship was head on to the tide again; and then lay her at the other side of her anchor. If she would not lie steady, steer her.

SHIP TENDING TO LEEWARD.

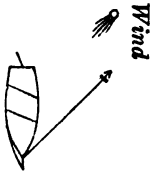
FIGURE 13.



Q.—The wind has been stronger than the tide, the tide is done, proceed to swing the ship?

A.—Fill the yards, hoist the foretopmast staysail, lee sheet aft, when she swings so as to shake the sail, haul it down, haul the yards forward, and slack away sufficient chain for the ship to ride leeward tide.

FIGURE 14.



Q.—Swing the ship, the tide during its strength having been stronger than the wind?

A.—*If the wind were aft* (Fig 13), keep the ship on the same side of her anchor as she had been on during the tide; when the tide eased give her a broad sheer, fill the yards, and set sail sufficient to send her ahead of her anchor. When she swung, stow the sails when they begun to shake, and slack away sufficient chain. *If the wind were on the off*

FIGURE 15.

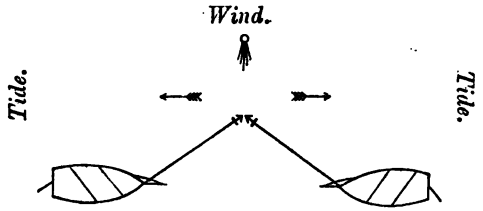
quarter (Fig. 14.) When the tide eased a little, sheer the ship to leeward of her anchor, set sail to pass it, and proceed as before.

Q.—Why would you sheer the ship to leeward of her anchor?

A.—Because, with the wind on the quarter, when the tide eases there is a risk of the ship being blown over her anchor if she be to windward, but if she be to leeward, there is none.

RIDING WIND ATHWART THE TIDE.

FIGURES 16 & 17.



Q.—You are riding with the wind athwart the tide. (Figs. 16 & 17.)

A.—Give the ship a slight sheer to leeward during the strength of the tide. WHEN THE TIDE EASED. *If it were moderate weather*, give her a broad sheer, haul all the yards aback, up staysail, weather sheet over. *If it were stormy*. Point the yards to the wind during the whole tide, and keep the staysail down.

Q.—Swing the ship ?

A.—Keep everything as it had been until she came head to wind, then change the helm, staysail sheet, and yards. When the tide came away strong, ease the helm.

HOW TO ACT WHEN THE WIND CHANGES.

Q.—The ship is riding leeward tide, the wind veers aft ?

A.—After the wind had veered aft, the ship would be riding weather tide, and I would act accordingly.

Q.—The ship is riding weather tide, the wind draws ahead ?

A.—After the wind had drawn ahead, the ship would be riding leeward tide, and I would act accordingly.

HOW TO ACT IN A CALM, AND SLACK TIDE.

Q.—Suppose there be neither wind nor tide sufficient to keep the chain tight, so as to clear the anchor when the ship swings ?

A.—Always pass the anchor on the same side. If I could not, heave short.

GENERAL RULES.

Q.—What are the general rules to be observed in ships at single anchor ?

A.—Keep a ship to leeward of her anchor as much as possible. A light ship will lie to leeward better than a loaded one.

Q.—What is the general rule for a tiller ?

A.—Keep it pointed to the anchor.

Q.—Are there any exceptions to this rule?

A.—Yes, there are. The first exception is when the ship is tending to windward and swinging with her head from her anchor. The second is when she is riding weather tide and breaking her sheer. In both cases keep the tiller pointed from the anchor till the ship is head on to the tide, then, in the case of breaking her sheer only, change it.

TO KNOW WHEN THE SHIP IS DRIVING.

Q.—It is blowing hard: how do you know when the ship is driving?

A.—If I can see two fixed objects in line abreast of me; then if they open so that the nearest one appears to move from me, the ship is driving. Or, if I put my foot on the chain and feel a trembling motion, the ship is driving. Or, if I drop the deep-sea lead, or a grapnell overboard, and the ship leave it so that the line grows ahead, the ship is driving.

TO EASE THE STRAIN ON THE CABLE.

Q.—How would you ease the strain on the cable in stormy weather?

A.—Slack away nearly as much chain as I thought it prudent to do before having to let go the second anchor, and then make top-blocks and snatch-blocks fast to the chain before the windlass and to the sampson post aft, reeve a warp in them to make a long tackle, and set all tight. Or, bend a strong coir cable on to the chain before the windlass, set it tight and make it fast aft. Or make the bight of a very strong coir cable fast to each quarter, pass the ends outside, forward and lash them to the cable chain outside of the hawse holes, ease the chain till the rope has a great portion of the strain.

SLIPPING FROM THE ANCHOR, PICKING IT UP, AND SWEEPING IT.

Q.—You are riding in an open roadstead, on a lee shore, taking in cargo, it comes on to blow, proceed to slip.

A.—I would take a hawser out of the quarter I intended to make the weather quarter, and bend it on to the cable chain outside of the hawse hole, haul it tight, make it fast, and bend a buoy on to the inner end. Next, pass a lanyard rope through the hawse hole and over the windlass to follow the chain, bend it on to the chain a fathom or so outside of the nearest shackle, bend a small buoy on to the other end, reef the sails and set them, when all ready knock out the shackle and slip.

Q.—The weather moderates, pick your anchor up.

A.—I would bring up with my second anchor as near to my first as I could, hoist out my boat and get hold of both hawser and lanyard rope buoys, take the lanyard rope to the windlass, heave in the slack chain and shackle it on. If I had no second anchor, I would get as near to

windward of the buoys as I could, keep just sufficient sail set to manage the ship, haul the mainyard aback and drift broadside on to the buoys, and get hold of them from the boat.

Q. Your buoy ropes have parted, sweep your anchor?

A. Get the lead line, attach weights to sink it, get the ends into two different boats, pull in the direction of the cable chain when it was slipped, when the lead line has caught the anchor. In like manner, get hold of the anchor with a piece of rope strong enough to weigh it, bring both boats together, put both ends of the rope through a shackle, let the shackle fall down to the anchor, take both parts of the rope to the windlass and weigh the anchor.

LETTING GO THE SECOND ANCHOR.

Q. The weather is getting worse, how much chain would you have out on the first anchor before you let go the second?

A. The longer the scope on both chains, the easier the ship will ride. I would, therefore, not pay out more than 45 fathoms of the first chain before letting go the second anchor. If I went into the anchorage in a gale, I would let go the second anchor as soon as I could after the first.

RIDING BOTH ANCHORS DOWN.

Q. You are riding with both anchors down, the weather moderates, what would you do?

A. I would pick up my second anchor.

Q. Why?

A. Lest the ship take a turn with the chains; and to have the second anchor ready to let go in the best position, that is to leeward of the first, in case a gale comes on again.

Q. You are riding in an open bay, a signal is made to prepare for a cyclone; do so.

A. I would send down topgallant yards and masts, gaffs, booms, and all tophamper, close reef the topsails, reef the courses, point the yards to the wind, close reef the mizen and trysails, secure the hatches, and everything about the decks and hold, get the spare anchors over the bows, with towline or hawser chain bent to them all ready to let go when I knew how the wind was going to be, and coir springs all ready to clap on the cable chains.

Q. You are in a place where you cannot get to sea, and where, therefore, the sails are of no use, is there any other precaution that you can take?

A. Yes; if the ship be well manned, I can send down all the yards, topmasts, and rigging attached.

Q.—The cyclone is now upon you in all its fury, the ship is driving towards the beach, is there anything else that you can do?

A.—As a last resource, to save the lives of the crew, the ship and cargo, I would cut away the masts.

MOORING—TAKING ANCHORS AWAY.

Q.—Moor a ship up and down the stream with 45 fathoms of cable each way.

A.—Let go the first anchor, pay out 90 fathoms of cable, pass a slip rope from aft round the second anchor shank close down to the crown, haul the anchor aft, make fast, let go the anchor and heave in 45 fathoms of the first chain. If both stopper and shank painter of the second anchor be let go at the same time the slip rope will not be wanted.

Q.—Run a kedge and warp away.

A.—Place a plank, say the loose, thwart across the boat's gunwale, well aft, place the flukes of the kedge on the plank and the stock abaft the boat's stern, stock the kedge, bend warp and buoy rope on to it, coil the warp into the boat, leave the end on board the ship, pull away, when the warp is tight run out, lay the kedge so that it can be hove clear of the boat, stream the buoy, and heave the kedge by lifting one end of the plank.

Q.—Take an anchor out.

A.—Run a kedge and warp away. If there be plenty of water, lower the anchor from the ship till the stock is awash, pass the stopper or shank painter through the ring, make one end fast to the ring bolt in the boat's stern post, and the other end fast to the ring bolt in her stem, lower the anchor down so that it will hang under the middle of the boat.

Note.—The Sylphide, when loaded, got ashore on the Island of Oland, and her anchor was taken out in this manner.

If there be not sufficient water to hang the anchor in the preceding manner, make a lanyard rope fast to the crown, hang the anchor to the boat's stern clear of the upper part, pass the stopper under the stock and make it fast, haul in the lanyard rope from forward of the boat, take care there is sufficient length of rope to allow the anchor to fall to the ground, make it fast, carry the chain in another boat, when ready haul the boat with the anchor out by the warp, when far enough let go.

To prevent the chain running out too fast and damaging the boat, lash a stout spar, with the staple norman in it, across the boat's gunwales aft, take a turn with the chain round another stout spar, lash this spar across the gunwales a little abaft the body of the chain, ease away the chain and haul the boat on board.

Note.—The lanyard rope on the crown of the anchor, and the chain in another boat, cause the anchor to fall clear. A better plan is to lower the anchor between two boats, lash its crown and ring to spars laid across the gunwales of the boats, and keep the greater weight nearer the larger boat.

UNMOORING.

Q.—Unmoor your ship.

A.—Heave the lee anchor up, cat and fish it, then heave the second anchor up,

GETTING UNDER WEIGH.

(See pages 352 & 353.)

Q.—It comes a fair wind, ship riding leeward tide, get under weigh.

A.—Heave short, loose the jib and staysail, heave the anchor up, cat and fish it, make sail.

Q.—It comes a fair wind, ship riding weather tide, get under weigh.

A.—Loose sails, heave the anchor up, cat and fish it, make sail.

Q.—It is a foul wind, the ship begins to tend to windward, get under weigh, cast to starboard.

A.—Heave short, hoist main and foretopsail, haul in the port fore braces and starboard main ones, loose jib and staysail, set mizen, put the helm hard a starboard, heave the anchor up, when the main yard fills fill the fore yard, hoist jib and staysail, cat and fish the anchor, make sail.

DREDGING.

Q.—You are riding leeward tide, there is a shoal astern of you, with deep water on each side of it, you must get under weigh.

A.—Heave sufficiently short to start the anchor, and then dredge the ship clear of the shoal.

CLUB HAULING, AND WEARING SHORT ROUND ON THE SHIP'S HEEL.

Q.—You come suddenly in with the land, the ship won't stay, and there is not room to wear.

A.—Supposing there be anchorage, club-haul the ship. *See page 356.* If there be no anchorage, make a stern board, and wear the ship round on her heel. *See pages 355 and 356.*

MISCELLANEOUS QUESTIONS.

Q.—State the advantages and disadvantages of having a buoy to the anchor.

A.—The advantages are, that the exact position of the anchor is known, so that the ship can be easily kept clear of it, and in case of slipping, or parting, it can be easily swept. The disadvantages are, that in a strong tide it has a tendency to start the anchor, and in a steamer to get foul of the propeller.

A.—It is a gale of wind, you are dismasted, or your engine is broken down, cannot set sail to steady the ship, how would you act?

A.—I would ride by a sea anchor made in a triangular form with three small spars lashed together, and other small spars or rope lashed across the triangle, and strong canvass fastened over all. Or ride by the middle of a large spar. Or, ride by the cable chain paid out.

Q.—A ship is riding in ten fathoms, how much chain should she have out, so that the strain may be applied to the anchor in the best position for it to hold.

A.—Not less than 187 fathoms.

Q.—What important lesson do you derive from this.

A.—That, in a gale, a ship should ride with a very long scope of chain out.

Q.—Will a ship ride easier in deep or in shoal water.

A.—In deep water.

Q.—Why.

A.—Because when anchored in deep water the chain hangs down in a curve, and its weight draws the ship ahead, so that the chain is generally slack between the ship and her anchor, and in consequence it acts as a spring or buffer does to a railway carriage, in easing the force of gusts of wind, or heavy seas striking the ship.

Q.—What precautions should be taken with the cable chain.

A.—It should occasionally be got on deck and examined, and the shackles put in order.

REMARKS.

The author thought it advisable to have the benefit of the opinions of experienced men on the preceding article, he therefore submitted it to Captain John Lindsay, for 45 years master in active service, and to the author's brother, Captain Stephen Bergen, for 35 years master in active service. The author tenders his thanks to these two gentlemen for several valuable corrections and suggestions. Captain Lindsay mentioned instances of the benefits he has seen from springs on the cables when the ship was riding out a cyclone; he also mentioned an instance of a ship riding remarkably easy with one anchor down, and both cables shackled together and paid out. Captain Stephen Bergen mentioned an instance of a ship riding very heavy with both anchors down; one of the chains broke, and then the ship rode much easier. In the opinion of the author this would arise from one of the anchors bringing the ship up suddenly when a heavy sea struck her, but when the chain broke the ship would yield to the force of the sea until it was exhausted.

Exn. 4a, *Port of*.....

Rotation No.

EXAMINATION PAPER TO BE USED BY ALL CANDIDATES WHEN APPEARING FOR EXAMINATION FOR THE FIRST TIME ONLY.

The Applicant is to write a short definition against so many of the following terms as may be marked with a cross by the Examiner. The writing should be clear, and the spelling should not be disregarded.

1.—The Equator is that great circle which is equidistant from both poles of the earth.

2.—The Poles are the ends of the axis of the earth, or those of the axis of the heavens.

3.—A Meridian is a great circle passing through the poles of either the earth or the heavens.

4.—The Ecliptic is that great circle which is the sun's apparent yearly path in the heavens.

5.—The Tropics are two parallels of latitude about 23° 28′ from the equator, one on each side of it.

6.—Latitude of a place is the arc of the meridian between it and the equator.

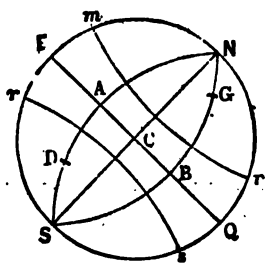
7.—Parallels of latitude are small circles parallel to the equator.

8.—Longitude of a place is the arc of the equator between its meridian and that of Greenwich.

ILLUSTRATIONS OF THE DEFINITIONS.

The following illustrations are in general drawn on the *Stereographic Projection of the Sphere*, in which a great circle is taken as the primitive, and the eye is supposed to be at its pole. For more information on this subject, see the Theory of Navigation and Nautical Astronomy.

Figure 1.



Definition 1. Figure 1. ECQ is the *Equator*.

Def. 2. Fig. 1. N.S. are the *Poles*.

Def. 3. Fig. 1. NESQN, NCS, NBS are *Meridians*.

Def. 4. Fig. 6. MT is the *Ecliptic*.

Def. 5. Fig. 1. mn, rs are the *Tropics*.

Def. 6. Fig. 1. Let G be Greenwich, D a place in south latitude. GB is the *Latitude* of Greenwich; DA is the *Latitude* of D.

Def. 7. Fig. 1. mn, rs are *Parallels of Latitude*.

Def. 8. Fig. 1. AB is the *Longitude* of D.

9.—The Visible Horizon is that circle which bounds the spectator's view at sea.

10.—The Sensible Horizon is the plane passing through the observer's place, and perpendicular to a plumb line.

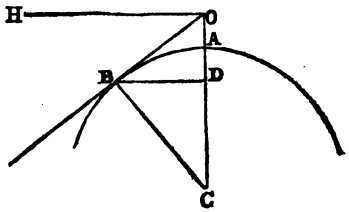
11.—The Rational Horizon is the plane passing through the centre of the earth, and parallel to the sensible horizon.

12.—Artificial Horizon and its use.—A reflecting fluid at rest; its use is to obtain altitudes of celestial objects.

13.—True course of a Ship is the angle between the true meridian and the rhumb line.

14.—Magnetic course is the angle between the magnetic meridian and the rhumb line.

Figure 2.

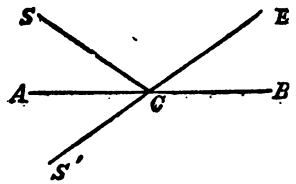


Def. 9. Fig. 2. The circle of which BD is the radius is the *Visible Horizon.*

Def. 10. Fig. 2. HO is the *Sensible Horizon.*

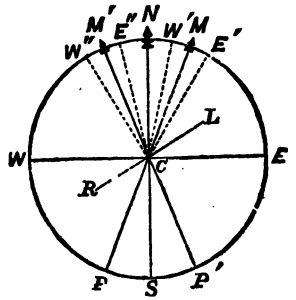
Def. 11. Fig. 2. The plane through C parallel to the Sensible Horizon is the *Rational Horizon.*

Figure 3.



Def. 12. Fig. 3. Let AB be the surface of the fluid, E the eye, S the sun, S′ its reflected image. Then Altitude=ACS=ECB=ACS′=½ SCS′.

Figure 4.



Def. 13. Fig. 4. Let NCS be the true meridian, N,S the North and South points of the true compass, E,W its East and West points, and C its centre. Let MP, M′P′ be magnetic meridians; CE′, CE″, CW′, CW″ directions of the compass needle; and RL the rhumb line, or ship's track. Then the angle NCL is the *True Course.*

Def. 14. Fig. 4. The angle MCL or M′CL is the *Magnetic Course.*

15.—Compass Course is the angle between the compass needle and the rhumb line.

16.—Variation of the Compass is the angle between the true and magnetic meridians.

17.—Deviation of the Compass is the angle between the compass needle and the magnetic meridian.

18.—The Error of the Compass is the angle between the true North and the North point of the compass.

19.—Lee Way is the angle between the ship's wake and the line of her keel.

20.—Meridian Altitude of a Celestial Object is its angular distance above the horizon, when the object is on the meridian.

21.—Azimuth is the angular distance of a celestial object from the observer's meridian; it is measured on the horizon.

22.—Amplitude is the angular distance of a celestial object on the horizon, from the prime vertical.

23.—Declination is the angular distance of a celestial object from the equinoctial; it is measured on a meridian.

24.—Polar Distance is the angular distance of a celestial object from the elevated pole; it is measured on a meridian.

Def. 15. Fig. 4. The angle E$_{,}$'CL, W$_{,}$'CL, E$_{,,}$''CL, or W''CL, is the *Compass Course.*

Def. 16. Fig. 4. The angle NCM is *East Variation of the Compass,* and NCM$_{,}$' is *West Variation.*

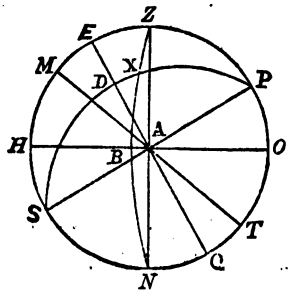
Def. 17. Fig. 4. The angles MCE', M$_{,}$'CE$_{,,}$'' are *East Deviations of the Compass*; and MCW$_{,}$', M$_{,}$'CW$_{,,}$'' are *West Deviations.*

Def. 18. Fig. 4. The angles NCE$_{,}$', NCW$_{,}$' are *East Errors of the Compass*; and NCE$_{,,}$'', NCW$_{,,}$'' are *West Errors.*

Figure 5.

Def. 19. Fig. 5. Let ABC be the line of the ship's keel, and BD the direction of her wake, then CBD is the leeway.

Figure 6.



Def. 20. Fig. 6. If M be the object on the meridian, HAM is its *Meridian Altitude.*

Def. 21. Fig. 6. If X be the object, the angle HZB, or arc HB, is the *Azimuth.*

Def. 22. Fig. 6. If B be the object, the angle AZB, or arc AB, is the *Amplitude.*

Def. 23. Fig. 6. If X be the object, the arc XD is the measure of the *Declination.*

Def. 24. Fig. 6. The arc PX is the measure of the *Polar Distance* of X.

25.—Right Ascension is the angle between two meridians, one passing through the celestial object, the other through the first point of Aries; it is measured Eastwards on the equinoctial.

26.—Dip or Depression of the Horizon is the angular distance of the visible below the sensible horizon.

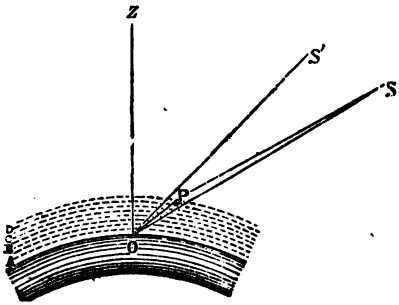
27.—Refraction is the bending of rays of light caused by the atmosphere.

28.—Parallax is the angle at a celestial object subtended by the earth's radius drawn from the observer's position.

Def. 25. Fig. 6. The arc AQED is the measure of the *Right Ascension* of X.

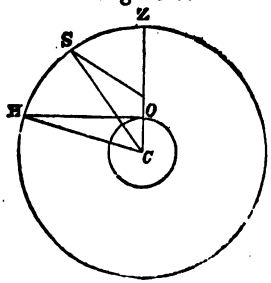
Def. 26. Fig. 2. The angle HOB is the *Dip*.

Figure 7.



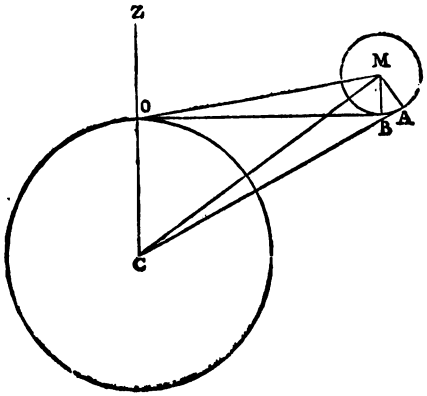
Def. 27. Fig. 7. The angle SOS′ is the *Refraction*.

Figure 8.



Def. 28. Fig. 8. The angle CSO is the *Parallax*.

Figure 9.



29.—Semi-diameter is the angle at the earth's centre subtended by the radius of the celestial object.

30.—Augmentation of Moon's Semi-diameter is the increase of the semi-diameter, owing to the increase of the moon's altitude.

31.—Observed Altitude is the angular distance of an object above the horizon as shewn by a sextant.

32.—Apparent Altitude is the observed altitude corrected for index error, dip, and semi-diameter.

33.—True Altitude is the apparent altitude corrected for refraction and parallax.

34.—Zenith Distance is the angular distance of a celestial object from the zenith.

35.—Vertical Circles are great circles passing through the zenith, and therefore perpendicular to the horizon.

36.—Prime Vertical is the vertical circle which passes through the rue East and West points of the horizon.

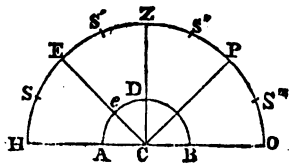
37.—Civil Time begins at Midnight and ends at the following Midnight.

38.—Astronomical Time begins at noon and ends at the following noon.

Def. 29. Fig. 9. The angle ACM, or BOM, is the *Semi-diameter.*

Def. 30. Fig. 9. BOM—ACM is the *Augmentation of the Moon's Semi-diameter.*

Figure 10.



Defs. 31, 32, and 33. Fig. 10. Let E be the centre of the celestial object, then the angle HCE is the *True Altitude* of the centre. This is found by applying the Index Error and Dip to the *Observed Altitude* of the Lower Limb, the result is the *Apparent Altitude* of the Lower Limb, to which the Refraction, Parallax, and Semi-diameter are applied.

Def. 34. Fig. 10. The angle ZCE is the *Zenith Distance* of E.

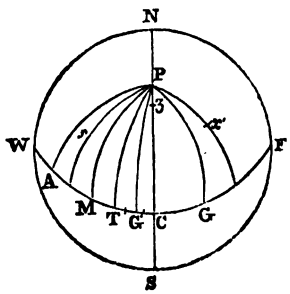
Def. 35. Fig. 6. ZAN, ZBN, and HZON are *Vertical Circles.*

Def. 36. Fig. 6. ZAN is the *Prime Vertical.*

Def. 37. Fig. 6. *Civil Time* begins when the sun is on the lower meridian HNO.

Def. 38. Fig. 6. *Astronomical Time* begins when the sun is on the upper meridian HZO.

Figure 11.



39.—Sidereal Time is the hour angle of the first point of Aries.

40.—Mean time is the hour angle of the mean sun.

41.—Apparent Time is the hour angle of the true sun.

42.—Equation of Time is the difference between mean and apparent time.

43.—Hour Angle of a Celestial Object is its angular distance from the observer's meridian; it is measured on the equinoctial.

44.—Complement of an Arc or Angle is the difference between the arc or angle and 90°.

45.—Supplement of Ditto is the difference between the arc or angle and 180°.

Def. 39. Fig. 11. See Page 16. Theory, for the explanation of the figure. The angle CPA is the *Sidereal Time.*

Def. 40. Fig. 11. The angle CPM is the *Mean Time.*

Def. 41. Fig. 11. The angle CPT is the *Apparent Time.*

Def. 42. Fig. 11. The angle TPM is the *Equation of Time.*

Def. 43. Fig. 11. CPx is the *Hour Angle* of x.

Def. 44. Fig. 6. The arc ZE is the *Complement* of HE; and the angle ZAE is the *Complement* of HAE.

Def. 45. Fig. 6. The arc EZO is the *Supplement* of HE; and the angle EAO is the *Supplement* of HAE.

Exn. 9a. *Port of*.....

Rotation No.

ADJUSTMENTS OF THE SEXTANT.

The applicant will answer in writing, on a sheet of a paper which will be given him by the examiner, all the following questions, numbering his answers with the numbers corresponding to the questions.

1.—What is the first adjustment of the sextant ?

2.—How do you make that adjustment ?

3.—What is the second adjustment ?

4.—Describe how you make that adjustment ?

5.—What is the third adjustment ?

6.—How would you make the third adjustment ?

7.—In the absence of a screw, how would you proceed ?

8.—How would you find the index error by the horizon ?

ANSWERS TO THE ADJUSTMENTS OF THE SEXTANT.

1.—The index glass must be perpendicular to the plane of the sextant.

2.—Place the index near the middle of the arc, and look into the index glass so that you can see both the arc and its reflection; if they be in one line, the glass is perpendicular, but if not in one line, they are brought so by gently moving the screws in the frame upon which the glass stands.

3.—The horizon glass must be perpendicular to the plane of the sextant.

4.—Place the zero of the vernier on O on the arc, hold the instrument obliquely, with its face upwards, and look at the horizon; if the reflected part and the direct portions of the horizon are in one line, this adjustment is perfect, but if not, they must be brought in one line by gently moving a screw at the back of the glass.

5.—The index and horizon glasses must be parallel when the index is at O.

6.—Place the index at O, and hold the instrument vertically, look at the horizon; if the reflected and direct parts are in one line, this adjustment is perfect, but if they are not in one line, move a screw at the back of the horizon glass until they are.

7.—I would find the index correction, or, as it is called, the index error.

8.—Hold the instrument vertically, and, looking at the horizon, I would move the tangent screw until the horizon in both parts of the horizon glass form one line; the reading is the index error.

9.—How is it to be applied?

10.—Place the index at error of minutes to be added, clamp it, and leave it.

NOTE.—The examiner will see it is correct.

11.—The examiner will then place the zero of the vernier on the arc, not near any of the marked divisions, and the candidate will read it.

NOTE.—In all cases the applicants will name, or otherwise point out, the screws used in the various adjustments.

NOTE to 10 and 11.—When the examiner is satisfied that the candidate can read the arc of the sextant both on and off the arc, it will be sufficient to place his initials against 10 and 11 on the paper containing the answer.

The above completes the examination of Second and Only Mates.

In addition to the above, First Mates and Masters will be required to state in writing:—

12.—How do you find the index error by the sun?

13.—How is the same applied?

14.—What proof have you that those measurements or angles have been taken with tolerable accuracy?

9.—To be added when the reading is off the arc, and to subtract when the reading is on the arc.

12.—I would place the index at about 32′ on the arc, and, looking at the sun, two suns will be seen; bring their upper and lower limbs in exact contact, read off and mark down, then place the index at about 52′ off the arc, or to the right of O, bring the lower and upper limbs in contact as before, read off and mark down; half the difference of these two readings will be the index error.

13.—It is to be added when the greater reading is off the arc, and subtracted when the greater reading is on the arc.

14.—I would add the two readings together, and divide the sum by 4; if the measurements be correct, the result should be nearly equal to the semi-diameter for the day, as given in the Nautical Almanac. If they do not so agree, I would repeat my observations until they do.

Exn. 9b. *Port of* .....

Rotation No.

EXAMINATION IN CHART.

The applicant will be required to answer in writing, on a sheet of paper which will be given him by the Examiner, all the following questions according to the grade of Certificate required, numbering his answers with the numbers corresponding with those in the question paper.

1.—A strange chart being placed before you, what should be your special care to determine, before you answer any questions concerning it, or attempt to make use of it?

2.—How do you ascertain that in our British charts?

3.—Describe how you would find the course by the chart between any two places, A and B.

4.—Supposing there to be 2¼ points of West variation at the first-named place, what would the course be magnetic? *the true course being N.E. ¼ N.*

NOTE.—In answering Question 4, Variation East allow to left hand, Variation West allow to right hand.

5.—How would you measure the distance between those two or any other two places on the chart?

6.—Why would you measure it in that particular manner?

The above comprises all the questions on the chart that are put to Mates and Only Mates.

In addition to the above, the Masters are required to answer:—

7.—What do you understand those small numbers to indicate that you see placed about the chart?

8.—At what time of the tide?

ANSWERS TO EXAMINATION IN CHART.

1.—Which is the north part of the chart.

2.—In our British charts there is always at least one compass, the true north point of which is designated by a star or other ornament.

3.—I would lay the edge of a parallel ruler over the two given places, A and B, then taking care to preserve the direction, I would move one edge of the ruler until it came over the centre of the nearest compass on the chart, the circumference of the compass cut by the edge of the ruler would show the course according to the direction the one place is from the other.

4.—2¼ points of West variation should be allowed to the right hand, and the magnetic course would be NE by E ½ E.

5.—I would measure one-half the distance on the chart by my dividers, then placing one leg of the dividers on the middle latitude, I would measure on each side of the same, and the distance measured between those two extreme points would be the distance.

6.—Because on a Mercator's chart the degrees of latitude increase as you approach the poles.

7.—Depths of water in fathoms, sometimes in feet.

8.—At low water ordinary springs.

9.—What are the requisites you should know in order that you may compare the depths obtained by your lead-line on board with the depths marked on the chart?

10.—What do the Roman numerals indicate that are occasionally seen near the coast and in harbours?

11.—How would you find the time of high-water at any place, the Admiralty time-tables not being at hand, nor any other special tables available?

All the above questions should be answered, but this does not preclude the Examiner from putting any other questions of a practical character, or which the local circumstances of the port may require.

9.—The time of the tide and the "rise and fall," or as it is now called the "mean spring range."

10.—The time of high water at that place at full and change of the moon.

11.—To the time of high water at full and change I would add 49 minutes for every day that has elapsed since the full or change of moon, the sum would be the P.M. tide for the given day approximately; or, to the time of the moon's meridian passage, corrected for longitude, add the port establishment, the sum would be the P.M. tide required.

DEVIATION OF THE COMPASS.

The applicant is to answer correctly at least eight of such of the following questions as are marked with a cross by the Examiner.

1.—What do you mean by Deviation of the Compass?

2.—How do you determine the deviation (*a*) when in port, (and *b*) when at sea?

3.—Having determined the deviation with the Ship's head on the various points of the Compass, how do you know when it is Easterly and when Westerly?

4.—Why is it necessary, in order to ascertain the deviations, to bring the Ship's head in more than one direction?

5.—For accuracy, what is the least number of points to which the Ship's head should be brought?

6.—How would you find the deviation when sailing along a well-known coast?

Questions 7, 8, 9 and 10 are solved in the Examples in the use of Napier's Diagram.

11.—Name some suitable objects by which you could readily obtain the deviation of the Compass when sailing along the coasts of the English Channel?

12.—Do you expect the deviation to change; if so, state under what circumstances?

13.—How often is it advisable to test the accuracy of your table of deviations?

14.—State briefly what you have chiefly to guard against in selecting a position for the compass.

ANSWERS TO THE QUESTIONS ON THE DEVIATION OF THE COMPASS.

1.—The difference between the correct magnetic course, and the standard compass course.

2.—By swinging or placing the Ship's head to every point of the standard compass, and then (*a*) By taking reciprocal bearings; the bearings of a distant object, or of some conspicuous object in a line with figures on a dock wall. (*b*) By bearings of well-known conspicuous objects in a line on the coast, or by azimuths and amplitudes and the known variation at the Ship's place.

3.—If the correct magnetic bearing of an object be to the right hand of the standard compass bearing, the deviation is East, but if it be to the left it is West.

4.—Because the deviation alters as the course alters.

5.—Eight; equi-distant.

6.—By taking the standard compass bearing of two well-defined objects in a line, as for instance, two points of land, two beacons, buoys, or light ships, not too near each other, the difference between the correct magnetic bearing by chart and the compass bearing is the deviation for the Ship's course when the bearing was taken.

11.—South Foreland lighthouse in one, bearing W. by N. correct magnetic, Beachy Head lighthouse, just open of the cliffs to the eastward, bearing NW. by W. correct magnetic. Portland lights in one. Shambles and one of Portland lights in one. Prawle Point and Start lighthouse in one. Lizard lights in one. Any two well-defined fixed objects at a moderate distance from each other that can safely be brought in one.

12.—Yes; it changes rapidly for several months after the ship is launched; it changes by change of the magnetic latitude; by the ship heeling over; by an alteration in the course steered for a long time; by taking in a cargo of iron; and by sudden blows from collision, stranding, very heavy seas, &c.

13.—Frequently in a new ship. When nearing land; and under the circumstances stated in Art. 12.

14.—Elongated iron, especially if it be vertical; as stern post, masts, funnels, davits, spindles, ventilators, &c.

15.—The compasses of Iron Ships are more or less affected by what is termed the heeling error; on what course does this error vanish, and on what courses is it the greatest?

16.—State to which side of the ship, in the majority of cases, is the North point of the Compass drawn in the Northern hemisphere; and what effect has it on the assumed position of the Ship when she is steering on Northerly, and also on Southerly courses?

17.—The effect being as you state, on what courses would you keep away, and on what courses would you keep closer to the wind, in order to make good a given Compass course?

18.—Does the same rule hold good in both hemispheres with regard to the heeling error?

19.—Your steering compass having a large error, how would you proceed to correct that compass by compensating magnets and soft iron, in order to reduce the error within manageable limits?

15.—It vanishes at near East and West courses, and it is greatest at near North and South courses.

16.—The North point is generally drawn to the weather side. The effect is to throw the Ship to windward on Northerly courses, and to leeward on Southerly courses.

17.—Keep away on Northerly courses, and keep closer on Southerly courses.

18.—No. In the Southern hemisphere the rule is frequently reversed, but in order to determine it, observations must be made in every ship.

19.—Draw two chalk lines on the deck, at right angles to each other, one fore and aft, the other athwartships, and with their point of intersection under the centre of the compass needle.

Look from the South to North, or from North to South.

BRING THE SHIP'S HEAD EITHER NORTH OR SOUTH, CORRECT MAGNETIC.

Place a magnet, or, if necessary, two, on the deck, athwartships, either before or abaft the binnacle, with its centre on the fore and aft line.

If the North end of the needle deviate to the right hand, place the North end of the magnet to the right hand.

But if it deviate to the left, place the North end to the left.

Then move the magnet gradually towards the binnacle, or from it, till the needle points correctly.

Next, BRING THE SHIP'S HEAD EAST OR WEST, CORRECT MAGNETIC.

Place another magnet on the deck, fore and aft, at either side of the binnacle, with its centre on the athwartship line.

If the North end of the needle deviate to the right hand, place the North end of the magnet to the right hand.

But if it deviate to the left, place the North end to the left.

Then move the magnet towards the binnacle, or from it, till the needle points correctly.

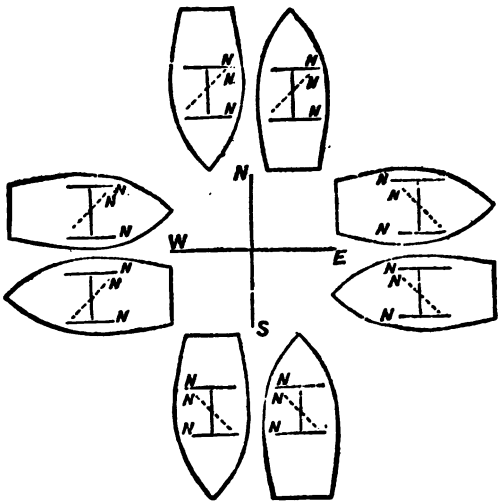
The preceding processes correct the *Semi-circular Deviation.*

To correct the *Quadrantal Deviation*, proceed as follows:

The Binnacle being fitted with cast iron correctors, or with small brass boxes, one on each side, port and starboard, of the needle, and at the same height as it.

Then *bring the Ship's head on one of the Quadrantal points*, N.E., S.E., S.W., or N.W., *correct magnetic.*

Then move the correctors towards the needle or from it, or put small chain into the boxes, till the needle points correctly.



In the above diagram, let the two lines at right angles to each other represent the cardinal points of the correct magnetic compass, and let the other parts of the diagram represent the deck plans of ships with their heads correct magnetic North, South, East and West.

One of the ships at the upper part of the diagram has her head North, the other has her's South.

In each ship, let the fore and aft line represent the correct magnetic meridian.

Look from South to North, or from North to South.

Let the dotted line represent the compass needle with its North end marked *N*, drawn to the right hand by the iron in the ship.

Let the athwartship lines represent the correcting magnets, one before the binnacle, the other abaft it.

Then, because *similar poles repel, and opposite poles attract each other* (Page 458) we have the following rule:

Place the upper magnet, with its North end, marked N, to the right hand, and it will repel the North end of the needle, while the South end of the magnet will attract the North end of the needle, and if the magnet be brought sufficiently near, these repulsions and attractions will force the needle into the correct magnetic meridian. The lower magnet will have the same effect.

When the ship's head is East or West, the compass needle is then athwartship, and the correcting magnet must be placed fore and aft.

By all the figures it appears that, *when looking from the South towards the North*, whether the ship's head be North, South, East or West.

If the North end of the needle deviate to the right hand, place the North end of the magnet to the right hand.

But if it deviate to the left, place the North end to the left.

The rules in the preceding page may be expressed as follows:

Whether the ship's head be North, South, East, or West, correct magnetic.

Place the magnets in the direction of East and West, correct magnetic; and so that similar poles may repel, and opposite poles attract, the compass needle into the direction of the correct magnetic meridian.

LEADING LIGHTS.

ENGLISH CHANNEL.

ENGLISH COAST.

Inter. denotes Intermitting. Rev. denotes Revolving. L.S. means Light Ship.

Name.	Num.	Kind.	Time Rev.	Fog Signals	Remarks.
Bishop Rock.	1	Fixed	.....	Bell	
St. Agnes.	1	Rev.	1 minute		
Seven Stones L.S.	2	Fixed	.....	Horn	
Longships.	1	Fixed	.....	Bell	
Wolf Rock.	1	Rev.	30 seconds	Bell	*Red* and *White* alternately.
Lizard.....	2	Fixed			
St. Anthony.	1	Rev.	20 seconds	Bell	
Eddystone.	1	Fixed	.....	Bell	
Start Point.....	1	Rev.	1 minute	Bell	
Portland Bill.	2	Fixed			
Shambles L.S.....	1	Fixed	.....	Gong	
Needles.	1	Fixed	.....	Bell	*Red* to seaward. *White* over Needles Channel.
St. Catherine's.	1	Fixed	.....	Horn	
Nab L.S.	2	Fixed	.....	Gong	
Owers L.S.	1	Rev.	30 seconds	Horn	Twice *White*, once *Red*.
Beachy Head.	1	Rev.	2 minutes	.....	Visible ¼ minute, invisible 1¾ minutes.
Royal Sovereign Shoals L.S.	1	Rev.	1 minute	.....	Three flashes in quick succession.
Varne L.S.	1	Rev.	20 seconds	Gong	*Red*.
Dungeness.	1	Fixed	.....	Horn	
South Foreland.	2	Fixed			
South Sand Head L.S.	1	Fixed	.....	Gong	
East Goodwin L.S.....	1	Rev.	15 seconds	Gong	*Green*.
Gull L.S.....	1	Rev.	20 seconds	Gong	
North Sand Head L.S.	3	Fixed	.....	Gong	Triangular.
North Foreland.	1	Fixed			

FRENCH COAST.

Name.	Num.	Kind.	Time Rev.	Fog Signals	Remarks.
Ushant, West end	1	Rev.	20 seconds	Horn	Twice *White*, once *Red*.
Ushant, East end	1	Fixed			
Ile Vierge	1	Fixed	.....	.....	*Red* flash every 4 minutes.
Ile de Bas	1	Rev.	1 minute	.....	
Sept Isles.....	1	Fixed	.....	.....	Flash every 8 minutes.
Heaux	1	Fixed			
Hanois	1	Rev.	45 seconds	.....	*Red*.
Casquets	3	Rev.	20 seconds	Bell	
Cape la Hague.....	1	Fixed			
Cape Barfleur	1	Rev.	30 seconds		
Cape la Heve	2	Fixed			
Fecamp	1	Fixed			
Point Ailly	1	Rev.	1 minute		
Point Touquet	2	Fixed			
Alpreck Point	1	Fixed	.....	.....	*Red* flash every 2 minutes.
Cape Grisnez	1	Rev.	30 seconds		
Calais	1	Fixed	.....	.....	Flash every 4 minutes.

EAST COAST OF ENGLAND.

Galloper L.S.	2	Fixed	.....	Gong	
Kentish Knock L.S. ...	1	Rev.	1 minute	Gong	
Sunk L.S.	1	Rev.	45 seconds	Gong	*Red* and *White* alternately.
Shipwash L.S.....	1	Fixed	.....	Gong	
Orfordness	2	Fixed			
Corton L.S.....	1	Rev.	20 seconds	Gong	*Red*.
Lowestoft	2	.....	.....	Bell	Lower *Red* Fixed. Upper Rev. 30 seconds.
St. Nicholas Gat L.S....	2	Fixed	.....	Gong	Lower *Red* flashes every 10 seconds.
Newarp L.S.	3	Fixed	.....	Horn	
Cockle L.S.....	1	Rev.	1 minute	Gong	
Winterton	1	Fixed			
Hasborough.....	2	Fixed			
Hasborough L.S.....	2	Fixed	.....	Gong	
Cromer.....	1	Rev.	1 minute		
Leman and Ower L.S....	2	.....	.....	Gong	Upper Rev. 1 minute. Lower Fixed.
Dudgeon L.S.	1	Fixed	.....	Gong	
Outer Dowsing L.S. ...	1	Rev.	20 seconds	.....	*Red*.
Inner Dowing L.S.	1	Rev.	20 seconds	Gong	*Green*.

EAST COAST OF ENGLAND.—(*Continued.*)

Name.	Num.	Kind.	Time Rev.	Fog Signals	Remarks.
Spurn L.S.	1	Rev.	1 minute	Gong	
Spurn	2	Fixed			
Flamborough	1	Rev.	30 seconds	Gun	Twice *white*, once *red*
Whitby	2	Fixed			
Hartlepool	1	Fixed			
Souter Point	1	Rev.	.....	Horn	Flash every 30 seconds.
Tynemouth	1	Rev.	1 minute	.....	*Red.*

WEST COASTS OF ENGLAND AND WALES.

Godrevy	1	Flash	10 seconds		
Trevose Head	2	Fixed	.....		
Hartland Point	1	Rev.	30 seconds	Horn	Twice *white*, once *red*
Lundy Island	2		.....	Gun	1 Rev. 2 minutes. 1 Fixed.
Nash	2	Fixed			
Scarweather. L.S.	1	Rev.	20 seconds		*Red*
Helwick L.S.	1	Rev.	1 minute	Gong	
Mumbles	1	Fixed			
Caldy Island	1	Fixed			
St. Ann's	2	Fixed			
Smalls	1	Fixed	.....	Bell	
South Bishop	1	Rev.	20 seconds	Gong	
Cardigan Bay L.S.	1	Rev.	30 seconds	Gong	*Red.*
Bardsey	1	Fixed			
Caernarvon Bay, L.S.	1	Rev.	20 seconds		Twice *white*, once *red*
South Stack	1	Rev.	2 minutes	Bell	
Skerries	1	Fixed			
Point Lynus	1	Rev.	10 seconds		
Great Orme Head	1	Fixed			
Air Point	1	Fixed			
Hoylake	2	Fixed			
Leasowe	1	Fixed			
Bidston	1	Fixed			
Rock	1	Rev.	1 minute	Bell	Twice *White*, once *Red.*
Crosby Point	1	Fixed			
Crosby L.S.	3	Fixed		Horn	
Bar, L.S.	1	Fixed	.....	Horn	
Formby L.S.	1	Rev.	.....	Bell	*Red*
N.W. Light Ship	1	Rev.	1 minute	Bell &	Gong, alternately.
Walney	1	Rev.	1 minute		
Morecambe Bay, L.S.	1	Flash	30 seconds		*Red.*
St. Bees Head	1	Fixed			

ISLE OF MAN.

Calf of Man	1	Rev.	30 seconds	Bell	
Douglas	1	Fixed			
Bahama Bank L.S.	2	Fixed	.....	Gong	
Ayr Point	1	Rev.	1 minute	.....	*Red* and *White* alternately.

NORTH CHANNEL.—WEST COAST OF SCOTLAND.—FIRTH OF CLYDE.

Name.	Num.	Kind.	Time Rev.	Fog Signals	Remarks.
Mull of Galloway	1	Rev.	3 minutes		
Corsewall	1	Rev.	1 minute	.....	*Red* and *White* alternately.
Pladda	2	Fixed			
Cumbrae	1	Fixed	.....	Horn	
Davar Island	1	Rev.	30 seconds	.....	
Sanda Island	1	Fixed	.....	.....	*Red.*
Mull of Cantyre	1	Fixed			
Ryhnns of Islay	1	Flash	5 seconds		

COAST OF IRELAND.

Fastnet	1	Rev.	1 minute		
Kinsale, Old Head	1	Fixed	.....		
Daunt Rock	1	Fixed	.....	Gun	*Red.*
Roche Point	1	Rev.	1 minute	Bell	*Red.*
Ballycottin	1	Flash	10 seconds	Bell	
Minehead	1	Inter.	.....	.....	*Bright* 50 seconds. *Dark* 10 seconds.
Waterford, Hook Head	1	Fixed	.....	2Bells	
Saltees L.S.	2	Fixed		Gong	
Tuskar	1	Rev.	1 minute	Bell	Twice *White*, once *Red.*
Lucifer L.S.	1	Fixed	.....	Gong	*Red.*
Blackwater	1	Fixed	.....	Gong	
South Arklow L.S.	1	Rev.	30 seconds	Gong	
North Arklow L.S.	2	Fixed			
Wicklow Head	1	Inter.	.....	.....	Visible 10 seconds. Invisible 3 seconds
Codling L.S.	1	Rev.	20 seconds	Gong	*Red.*
Kish L.S.	1	Rev.	1 minute	Gong	
Bailey	1	Fixed	.....	Bell	
Rockabill	1	Flash	12 seconds		
Haulbowline	1	Fixed	.....	Bell	
St. John's Point	1	Inter.	1 minute	.....	*Red.*
South Rock	1	Rev.	1½ minute	Bell	
Copeland	1	Fixed	.....	Bell	
Maidens	2	Fixed			
Rathlin	2	.....	.....	Gun	Upper Rev. 1 minute. Lower Fixed.
Inishowen	2	Fixed			
Inishtrahull	1	Rev.	2 minutes		

NOTE.—A white light, hung to the fore stay, 6 feet above the rail, of every light ship on the coasts of England and Ireland, shews how the vessel is riding.

DAY MARKS FOR LIGHT VESSELS.

Inner Dowsing.—Two balls, one above the other.

Outer Dowsing.—Half ball over a ball.

Dudgeon.—One ball.

Leman and Owers.—Ball on each mast, one higher than the other.

Corton.—Half ball under a ball.

Sunk.—Half ball over a ball.

Kentish Knock.—Small ball over a large ball.

In all the other light ships the numbers of the lights and balls are equal.

Take sail off the ship; she will most likely fly into the wind; keep her so by the main topsail full and foretopsail aback, and perhaps the mizen set. If the sails will not fetch the ship into the wind, ride by about 30 fathoms of cable chain payed out; or by a span fast to a large spar.

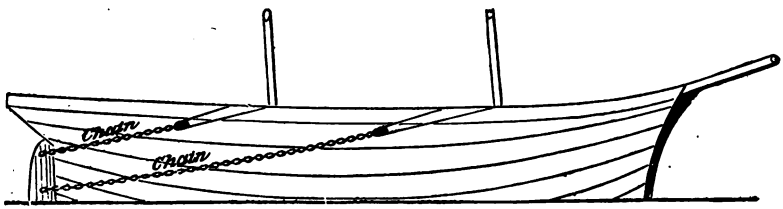
The ship being quiet: make a temporary rudder according to one of the following plans.

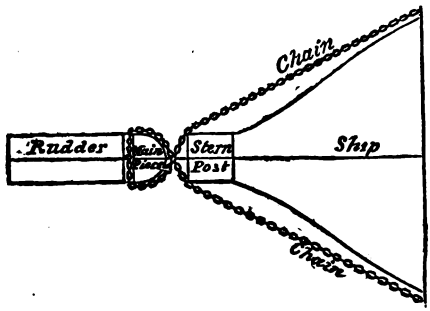
Capt. F. W. Withers, Examiner in Seamanship to the Local Marine Board, London, suggests a method which may be described as acting on the same principle as an oar at a boat's stern does. He proposes that one end of a spar should be suspended by a chain down the rudder trunk, or under the counter, and the other end should have a blade like an oar; weights attached to sink it, a tackle to trice it up when necessary, and guys to lead through blocks at the end of a spar across the stern, and thence to the barrel of the wheel.

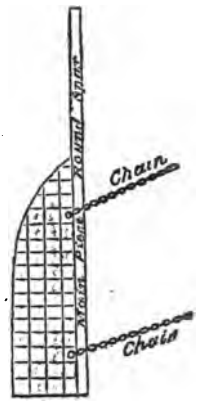
Diagrams and descriptions are given in the Nautical Magazine for November, 1873.

The following are other methods which have been used.

TO MAKE AND FIX A TEMPORARY RUDDER.







Take a spare spar and cut it the length of the main piece of the intended rudder, (which length can be found by measuring from the upper mark on the stern post to the height required above the deck); then bolt shorter pieces on to the after part of the main piece, so as to form a rudder, and to strengthen these, nail planks or bulwarks across them. Then cut two large holes abaft the main piece, one about two feet below the rudder trunk, and the other about three feet from the heel. Reeve a hawser chain through each hole; middle them, and knot them with an overhand knot before the main piece; seize the knot; worm and serve the chain with rope where it takes the sternpost, so as to prevent chafe. Take two lines from each side of the ship, and make them fast to the ends of the chains; get two tackles on each side ready to haul the chains taut.—*See the adjoining diagrams.* Attach a small kedge with a slip rope to the heel of the rudder, to sink the lower end; secure the bight of a hawser to the end of the rudder, and pass one end of it under the counter and up the rudder trunk. Rig a small pair of shears over the rudder trunk, with a snatch-block made fast to the crutch.

When all is ready, the kedge and rudder could be put over the lee quarter or taffrail, the chains being hauled in by the lines on their respective sides, and the hawser hauled up the rudder trunk as the other one is slacked away, and when the rudder head is directly below the trunk, the hawser up the trunk could be snatched, and hove upon till the rudder head is high enough above the deck; after which the hawser chains should be bowsed well taut on each side, taking care that the rudder is fairly abaft the stern post; the lowest chains taken well forward, say to the fore chains; the upper chains further aft, say about the main chains. When all is well taut, the kedge should be slipped and hauled in, the tiller fit on to the rudder head or a hole cut, and a spar put through for a temporary tiller.

If the rudder is light, and likely to jump up with the sea, its head should be kept well up, and a broad strong plank put above it, and secured to the rail on each side, so that the head just touches, and if the rudder is heavy and inclined to fall, a small pair of shears over the trunk with a small tackle would keep it up.

To prevent the rudder head damaging the rudder trunk, if two planks or spars are bolted or secured athwart the deck, one before and one abaft the rudder head, just so near that the rudder could move, the spars where they take the rudder to be rounded and greased; these would keep it steady from moving fore and aft, and two pieces fitted in fore and aft would keep the rudder from moving athwart.

A ship which lost her rudder in the Atlantic, was brought safely to the Tyne with such a rudder as the above.

Should the vessel be near her port at the time of losing her rudder and the sea be smooth, a spar may be put over the taffrail, with a hawser chain round the outer end to keep it down; a few pieces of wood nailed across the end within, so as to form the blade of an oar; a hawser or small chain brought from the end of the spar to each quarter, or to outriggers on each quarter, and taken to the wheel or hauled by tackles; the inner end of the spar being kept up with a tackle to the main-mast head, and secured in the middle of the taffrail, and matted.

A vessel may be steered into port by two smacks, or better still, by two steamboats, one ahead and the other astern, or by one or both alongside.

It has been recommended to tow a boat astern with her plug out.

Or Lash a stout block at each end of a spare topmast, or other suitable spar; lash the spar across the quarters a little before the wheel. Pay about 40 fathoms of cable chain over the stern; middle about 50 fathoms of lanyard rope; pass it round the barrel of the wheel, and the ends through the blocks at the ends of the spar, and make them fast to the cable chain; pay away chain until the lanyard rope touches the water; the apparatus is then ready for use.

Specimen of the Adaptation of Table XXVIII to the Solution of Azimuths.

TABLE XXVIII.

Logarithms for finding the apparent time, or true Azimuth.

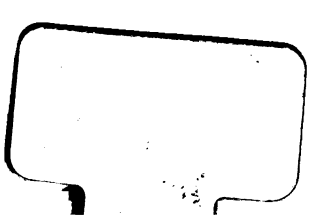
4 HOURS.

Arc.	Time M	′ 0 15 s 30 0 45	′ 1 16 s 31 4 46	′ 2 17 s 32 8 47	&c.
°					
70	40	9·51718	51736	51754	
	41	51988	52006	52024	
	42	52257	52275	52293	&c.
	43	52525	52542	52560	
71	44	9·52791	52809	52826	
	45	53056	53074	53091	
	46	53320	53337	53355	
	47	53582	53600	53617	
72	48	9·53844	53861	53879	
	49	54104	54121	54139	
	50	54363	54380	54397	&c.
	51	54621	54638	54655	
		&c.		&c.	

At page 176, Third Edition of the Navigation, in the Azimuth question; the sum of the four logarithms, rejecting 10 in its index is 9·533347; and by the preceding Table, the Arc corresponding to this Logarithm is 71° 31′, which is found thus.

The nearest Logarithm, omitting the index, in the table, to the preceding Logarithm is 53337, which is the third downwards in the compartment corresponding to 71° at the left side of the page. For the minutes of arc, look at the right side of the top compartment, third number downwards, which gives 31′.

See Remarks on Table XXVIII page 14. Appendix.



CONTAINS

DIAGRAMS,

EXPLAINING

THE DEFINITIONS,

SHIPS RIDING AT SINGLE ANCHOR

AND

THE EFFECT OF MAGNET

On an Iron Ship's Compass.